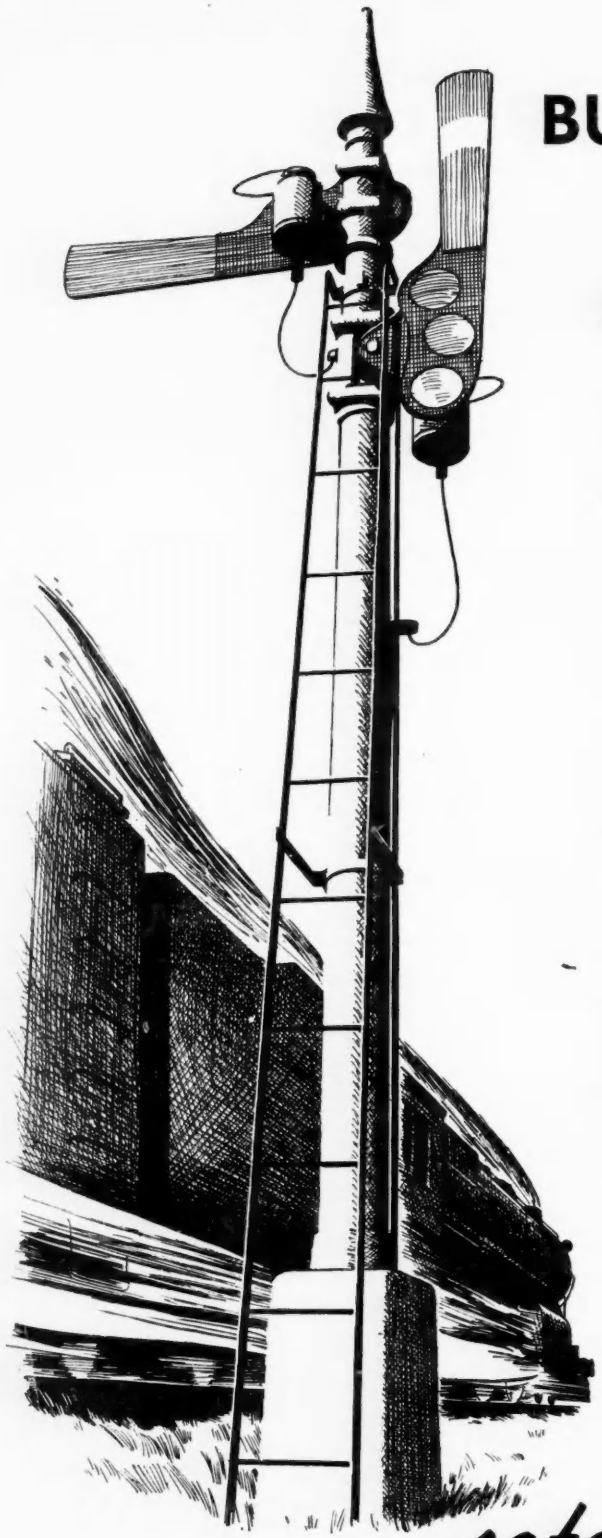
Devoted to
TEXTILE
CHEMISTRY
BLEACHING
DYEING
PRINTING
FINISHING

DECEMBER 29, 1947
VOLUME 36, No. 26

AMERICAN DYESTUFF REPORTER

Happy New Year
We hope that we may
continue to serve you in
'48 and help to make
your new year brighter
and more colorful.
Du Pont Dyestuffs
DU PONT
BETTER THINGS FOR BETTER LIVING ... THROUGH CHEMISTRY

OFFICIAL PUBLICATION
of the
PROCEEDINGS
AMERICAN ASSOCIATION
OF TEXTILE CHEMISTS
AND COLORISTS



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Safety!

Is it safe? There can be only one answer to that question when it concerns a processing agent. Even efficiency must get second consideration. If it isn't safe, it isn't efficient.

One of the qualities of Olate most highly valued by textile processors is its safety—to every fiber and fabric.

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Ideal combinations for perfect coloring throughout the red range and into gold . . . everything you need for complete satisfaction in Naphtol dyeing and printing. Let us demonstrate the A.A.P. way to best results with the Naphtol process; just call our nearest office, and an A.A.P. technician will gladly visit your plant.

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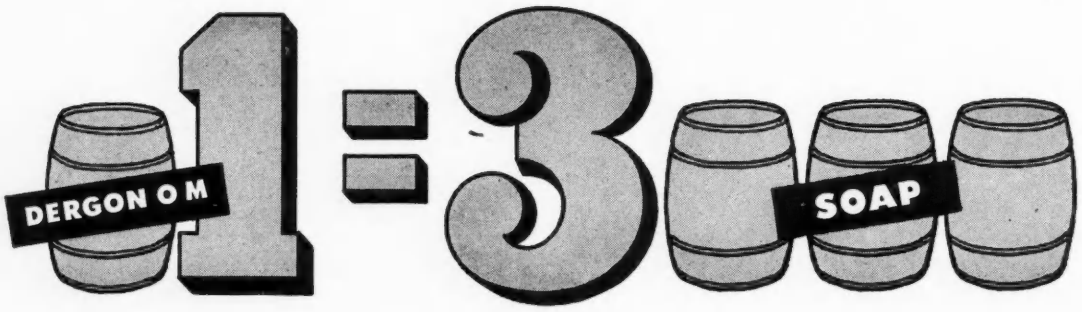
(Reg. U. S. Pat. Off.)

for scouring all types of fabrics, woolens, cottons, rayons, and all knitted fabrics, including hosiery



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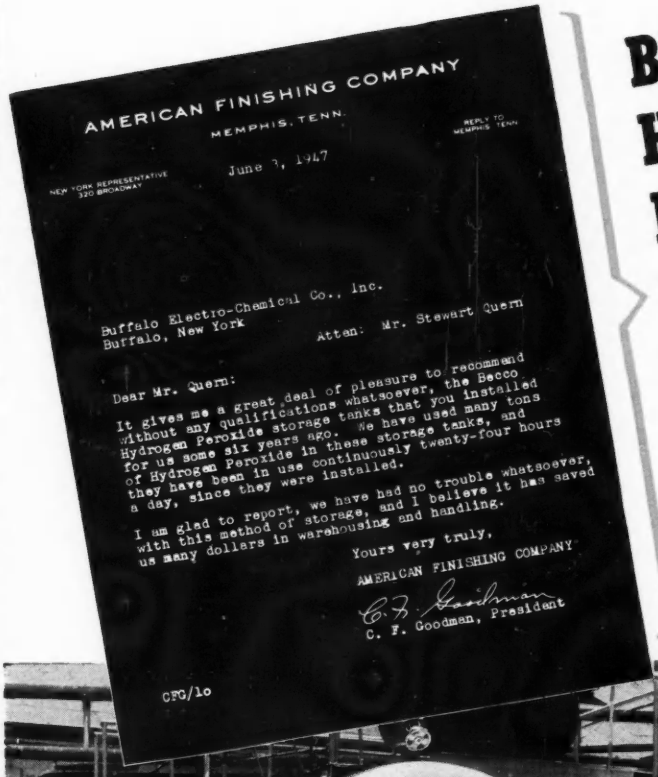

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June 3, 1947

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Buffalo, New York

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Dear Mr. Quern:

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I am glad to report, we have had no trouble whatsoever with this method of storage, and I believe it has saved us many dollars in warehousing and handling.

Yours very truly,

AMERICAN FINISHING COMPANY

C. F. Goodman, President

CFG/lo

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The American Finishing Company is only one of Becco's distinguished customers who use, with complete satisfaction, Becco Hydrogen Peroxide in bulk shipments.

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with these outstanding advantages:

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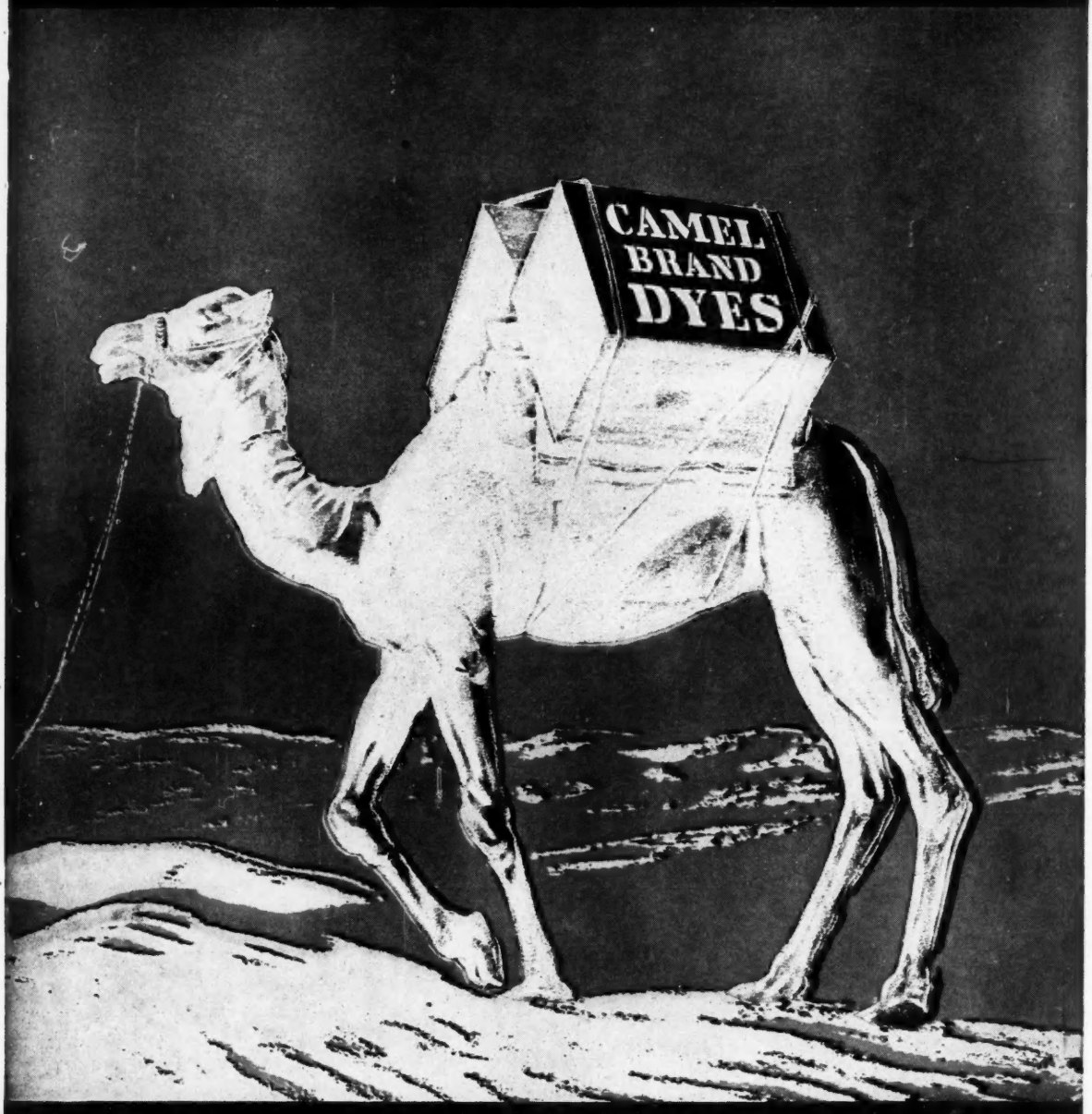

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Du Pont Surface Active Agents can help you solve your knottier textile problems, too. Yes, if it's results you want, you can count on this line of products.

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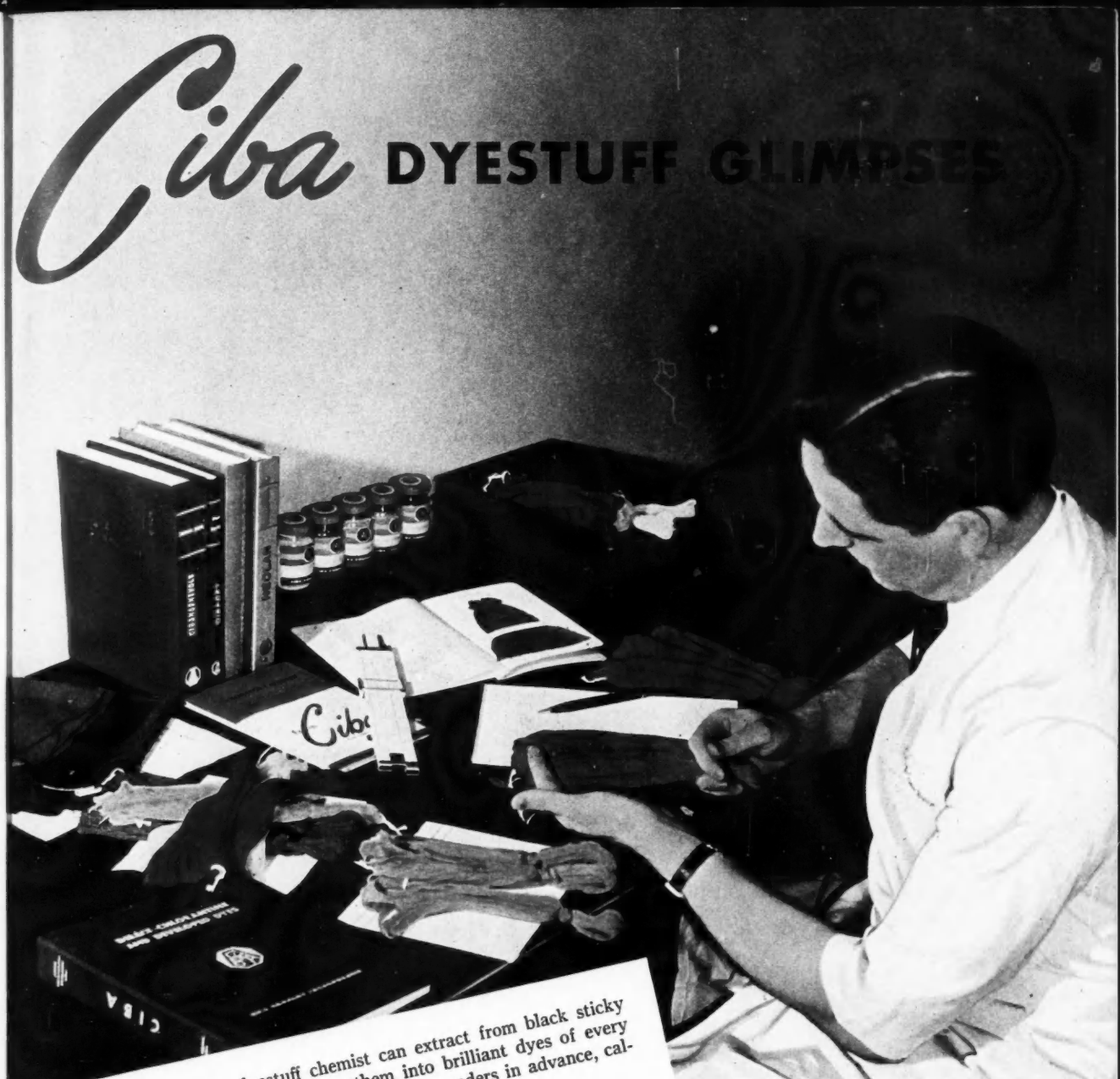
Ciba DYESTUFF GLIMPSES



It is true that the dyestuff chemist can extract from black sticky tar crystal clear liquids and transform them into brilliant dyes of every shade imaginable. More amazing, he plans these wonders in advance, calculates them and determines the course they are to take.

Nature, however, reveals her secrets reluctantly and continues to present ever new riddles in the miracle of color. For a time the molecules seem to be guided willingly along the road mapped out for them — then suddenly they strike out on their own, like an army in revolt against the strategy of its leader. Or maybe the chemist will succeed, after months or years of effort synthesizing a new dyestuff, only to find that it is not equal to his expectations. The daily work of the industrial laboratories of the world is enormous but on the average, out of several hundreds of dyestuffs prepared, only one marks a decisive improvement over those already on the market.

Step by step generations of chemists have raised Ciba's range of dyestuffs to its present eminence. For every consumer and every purpose it offers dyestuffs which yield shades of unexcelled beauty and fastness.

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VAT DYES OF THE DOW CHEMICAL COMPANY

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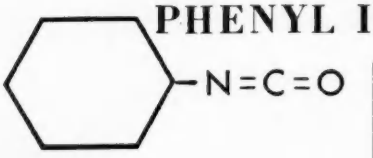
A NEW CHEMICAL

Hooker Research Presents . . .

PHENYL ISOCYANATE (phenyl carbonimide)



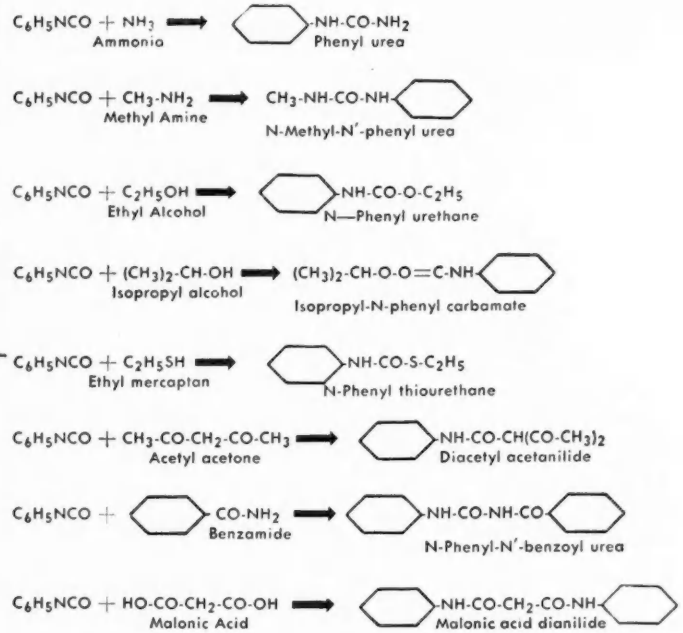
DESCRIPTION:
Phenyl Isocyanate is a pungent, lachrymatory, almost water white liquid.

PHYSICAL DATA:

Empirical Formula	C_6H_5NCO
Molecular Weight	119.12
Sp. Gravity, 15.5°/15.5°C	1.101
Refractive Index, n 20, D	1.535
Freezing Point	−33°C
Boiling Point	162°C
Vapor Pressure, 100°C	108 mm
Flash point (closed cup)	63°C

SUGGESTED USES:
As a versatile intermediate for chemical synthesis, it has many interesting possibilities in the manufacture of alkyd resins, textile finishing agents, herbicides and other as yet undiscovered products. Among the various classes of compounds that might be produced thru phenyl isocyanate are: other isocyanates, ureas, anilides, dianilides, urethanes, thiourethanes, carbamates, and thiocarbamates.

SOME TYPICAL REACTIONS *of Phenyl Isocyanate*



For more technical information, write on your company letterhead for Data Sheet No. 372. Limited sample quantities of this product are available for experimental work.

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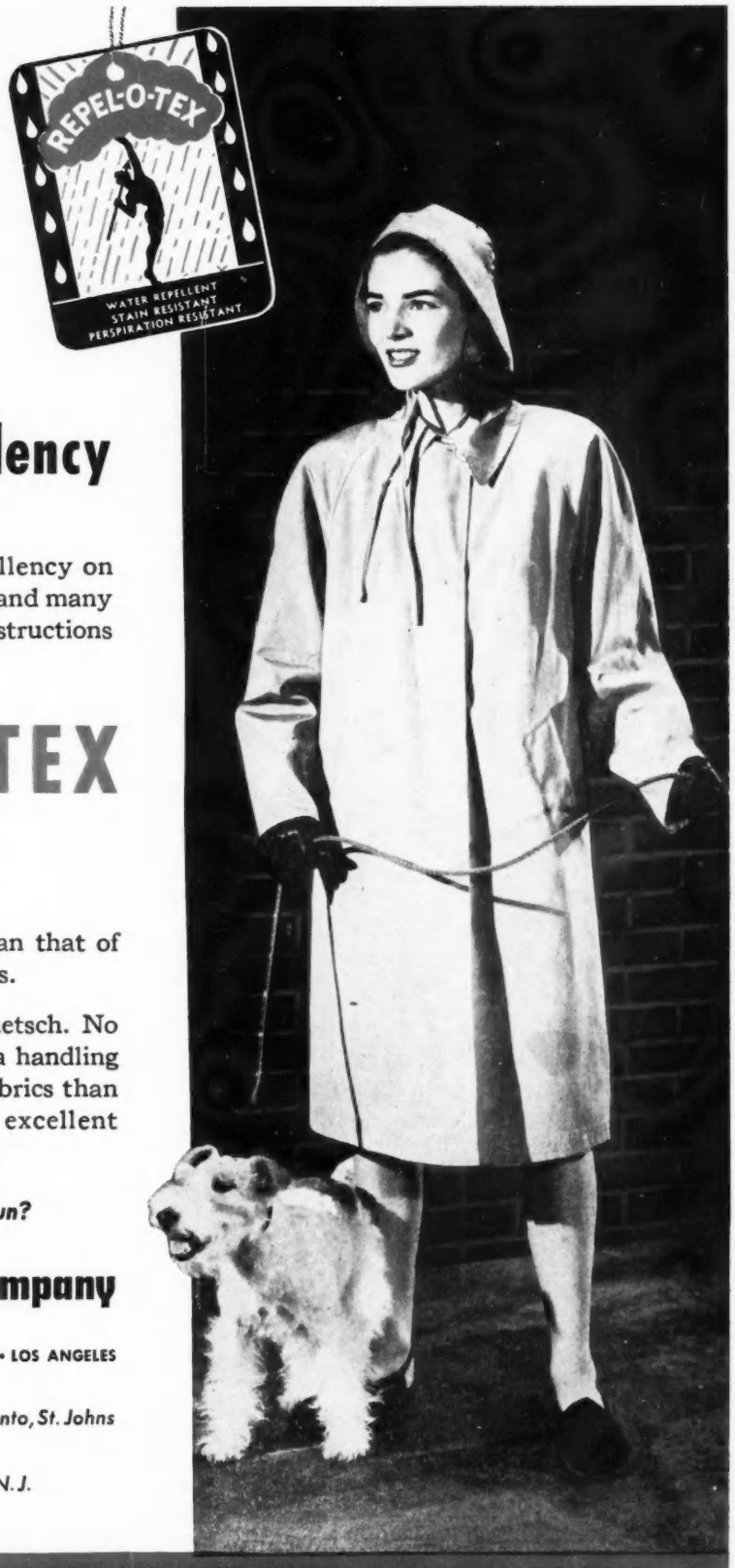

For Durable . . .
Low Cost . . .
Water Repellency

REALLY LASTING water repellency on cotton-rayon, cotton-acetate and many all rayon, acetate and nylon constructions is provided by

REPEL-O-TEX
D3 & D4

. . . yet the cost is no greater than that of ordinary fugitive repellent finishes.

Easy to apply in jig, pad or quetsch. No curing . . . no scouring . . . no extra handling operations. Applicable to other fabrics than those enumerated above, with excellent effects of less durability.

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SULPHONATIONS REVUE

highlighting that great performer "MONOPOLE"

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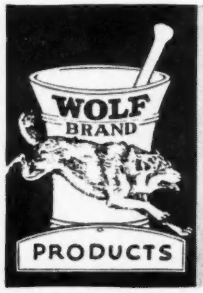
Monopole Brilliant Oil	Sulphonated Oleic Acid
Sulphonated Amides	Sulphonated Olevene
Sulphonated Castor Oil	Sulphonated Red Oil
Sulphonated Cocoanut Oil	Sulphonated Tallow
Sulphonated Corn Oil	Emulsified Mineral Oil

Soluble Pine Oil

And combinations with all types of solvents



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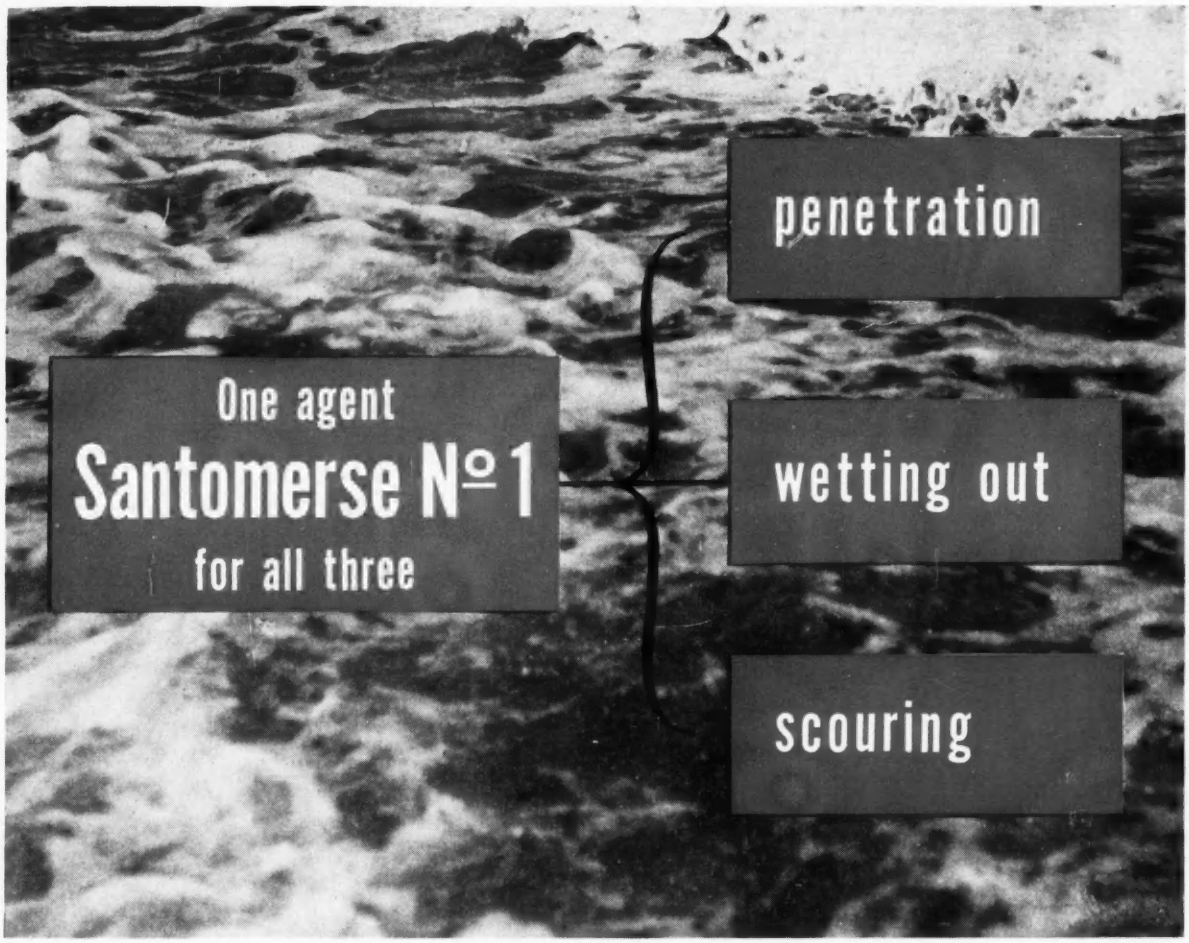

HOW SANTOMERSE No. 1 IMPROVES RAYON PROCESSING

APPLICATION	EFFECT
Viscose—	
Bleaching	Wetting, penetrating
Crepeing	Wetting
Desulfuring	Wetting, dispersing
Dyeing	Wetting, leveling
Finishing	Wetting
Sizing	Wetting, penetrating
Spinning	Wetting
Washing	Cleansing
Acetate—	
Crepeing	Wetting
Desizing	Cleansing
Dyeing	Wetting, leveling
Finishing	Penetrating
Saponifying	Wetting, penetrating
Scouring	Cleansing
Sizing	Wetting, penetrating

Now, in Santomerse No. 1 you can get *one* agent that meets requirements for *all three* of these vital functions . . . penetration, wetting out and scouring (cleansing).

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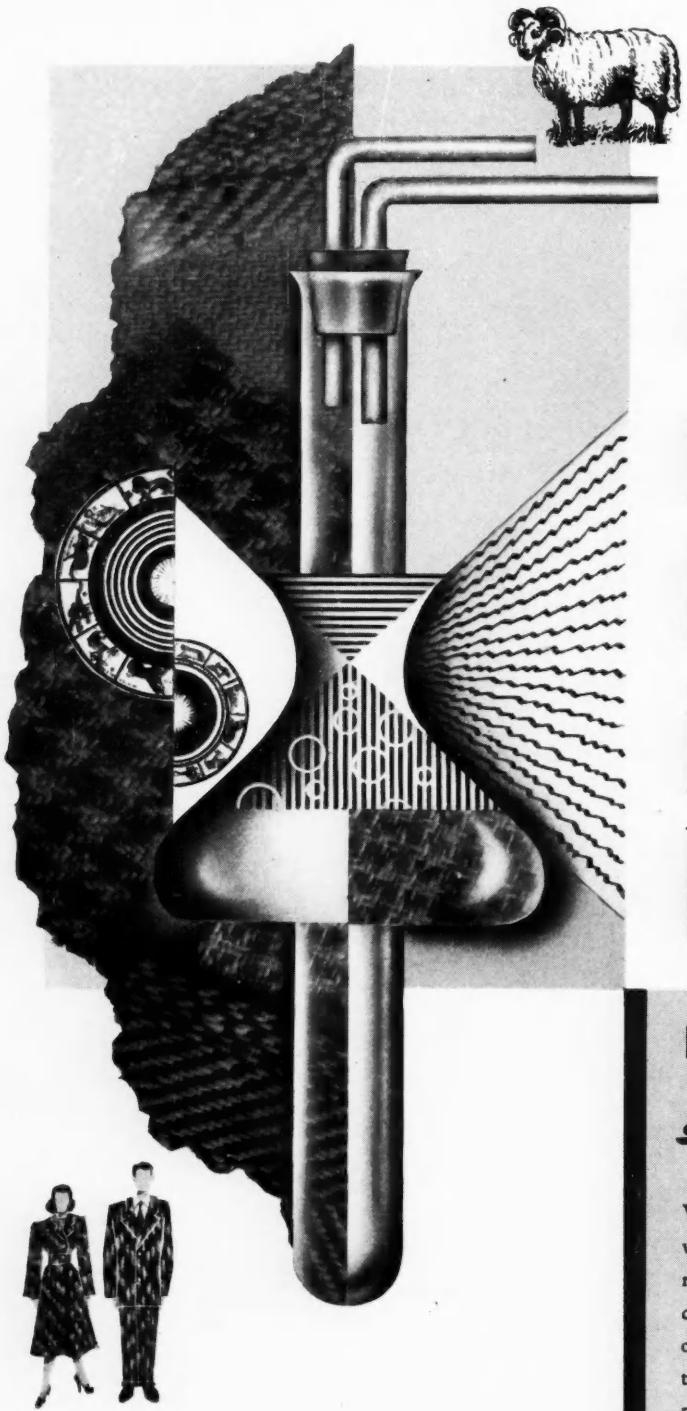

a new fabric is born

BUT...

How Will it Scour?

With a yard of your fabric in the grease we are in a position through our research laboratory to give you a complete detergency analysis. Join our many customers who are enjoying this service that offers you the most economical procedure for scouring your fabrics.

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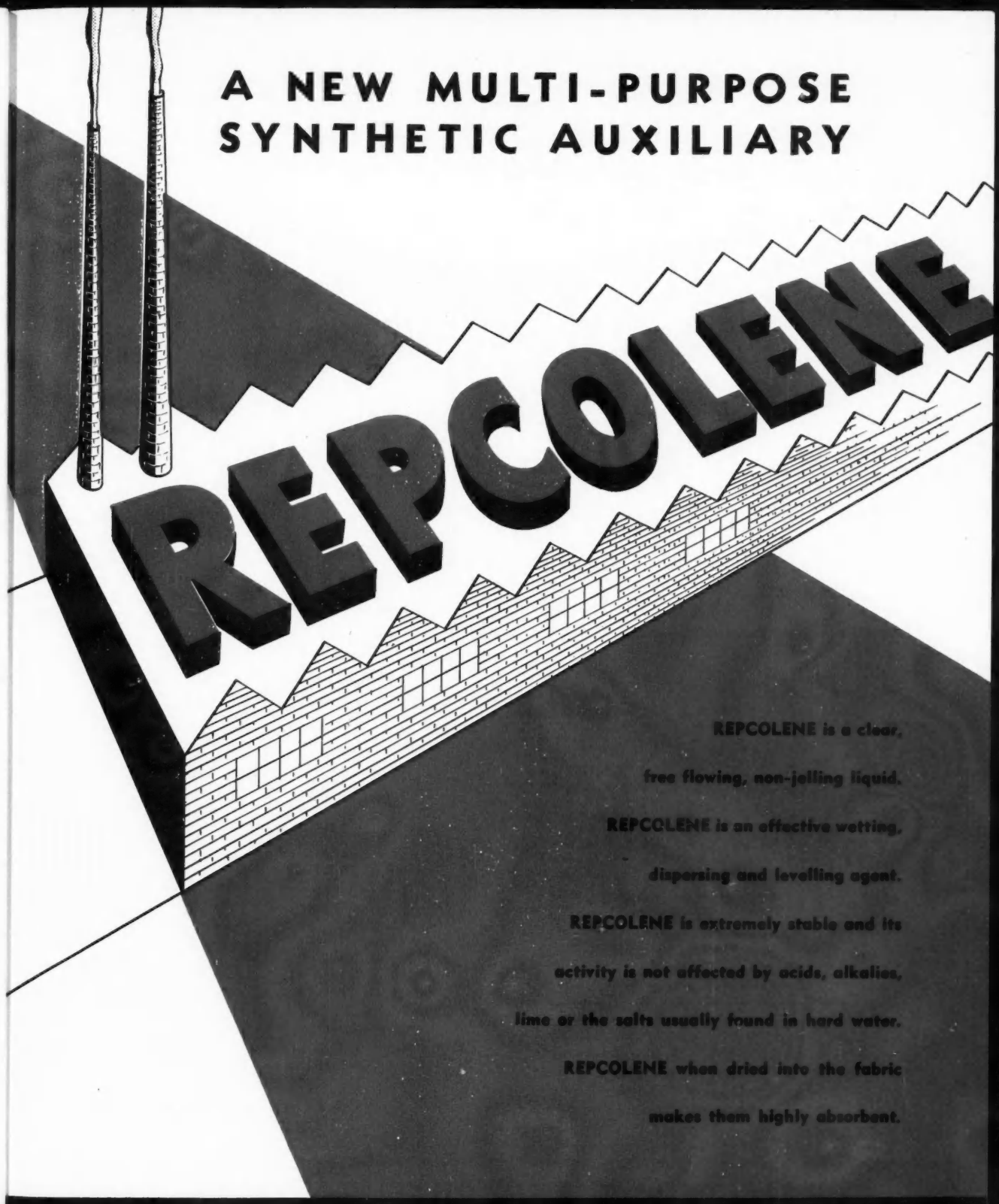
A NEW MULTI-PURPOSE SYNTHETIC AUXILIARY



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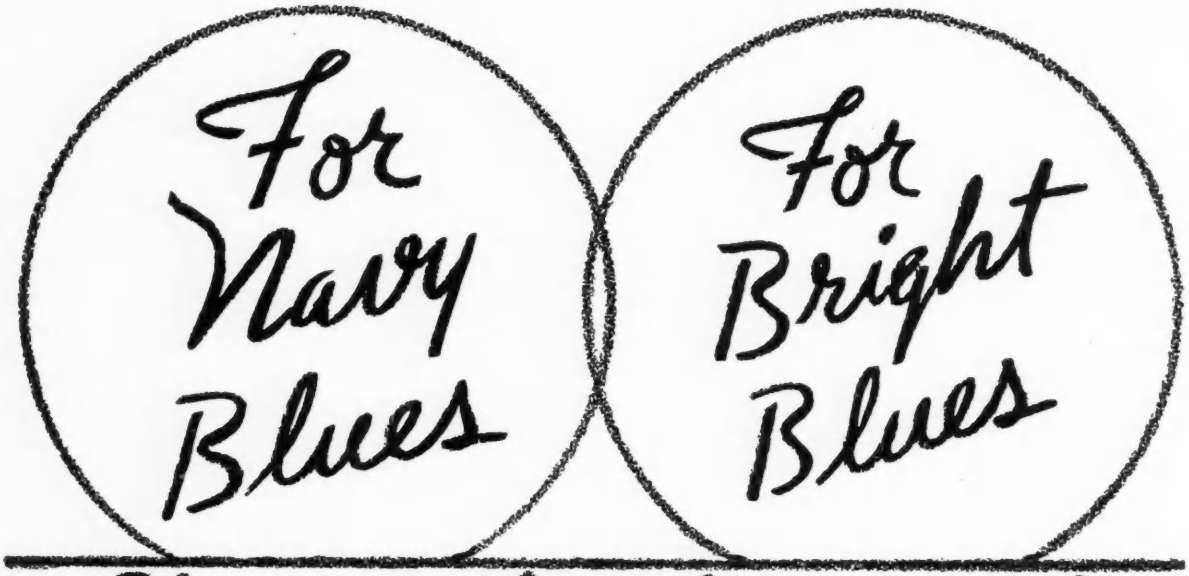

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Blue GNXX
Blue GDNN

THESE azoic colors, for printing cotton, linen or rayon, produce Navy Blue of good fastness at a low cost. In combination with the Pharmasol Yellows they produce deep Browns.

PHARMASOLS are stabilized solutions, adjusted to the most practical concentration, which can be easily applied with a maximum of efficiency.

PHARMASOLS do not decompose and thereby they overcome the otherwise problems of troublesome dissolving.

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Official Publication of the Proceedings of the American Association of Textile Chemists and Colorists

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Published every other Monday by
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One Madison Avenue, New York 10, N. Y.

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December 29, 1947
VOLUME 36 NUMBER 26

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American Association of Textile Chemists and Colorists

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DECEMBER 29, 1947

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Student Chapters

Lowell Textile Institute
North Carolina State College
Philadelphia Textile Institute
New Bedford Textile Institute
Georgia School of Technology
Clemson College

Members should notify the Secretary immediately of all address changes

Meeting, Rhode Island Section

A MEETING of the Rhode Island Section was held in the Providence Engineering Society Hall on Friday, November 28, 1947, with approximately 100 members and guests present.

The election of officers for 1948 took place and the following were unanimously elected:

Councilor for 3 years—George H. Wood, Jr.

Chairman for 1 year—Raymond W. Jacoby.

Vice Chairman for 1 year—Robert W. Joerger.

Secretary—Emory A. Richards.

Treasurer—Robert W. Farwell.

Corporate Membership — Kenneth J. Broden.

Sectional Committee

Earl D. McLeod.
Herbert S. Travis.
Herman Allen.
Richard Powell.

Program Committee

Alfred Henschel.
Carl Medde.
Robert P. Wood.
Dr. Lewis D. Cook.
William M. Thornton.

This was followed with the presentation of two papers:

"Some Modern Chemical Methods for Shrinkage Control of Textiles" by Leonard Shapiro of Alrose Chemical Co.

"The Manufacture & Processing of Quality Blended Fabrics" by Emory A. Richards of Airedale Worsted Mills, Inc.

Respectfully submitted,
E. A. RICHARDS, *Secretary.*

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Meeting, Southeastern Section

A MEETING of the Southeastern Section at the Ansley Hotel, Atlanta, on December 6th, was called to order by the Chairman, A. Kempton Haynes.

Mr. Haynes immediately appointed tellers—Earle Mauldin, M. T. Barnhill, and F. L. Lense—to count the ballots for the officers for the year 1948. The nominations were as follows:

Chairman, C. Russell Gill.
Vice-Chairman, Howard M. Waddle.
Secretary, S. J. Davis.
Councilor, W. B. Griffin.
Treasurer, W. Fred Crayton, J. W. Richardson.

Sectional Committee, George L. Dozier, Lee L. Baker, Robert L. Horney, Paul G. Wear, James L. Taylor.

The results of the election were as follows:

Chairman, C. Russell Gill.
Vice-Chairman, Howard M. Waddle.
Secretary, S. J. Davis.
Councilor, W. B. Griffin.
Treasurer, W. Fred Crayton.

Sectional Committee, George L. Dozier, Lee L. Baker, Robert L. Horney, Paul G. Wear.

A total of 67 were present for the dinner.

The treasurer reported a balance of $265.81.

The speaker of the evening was Thomas R. Smith, Manager, Yarn Dyeing Department, Wiscasset Mills Company, Albemarle, North Carolina, introduced by William B. Griffin, Program Chairman.

The Chairman-elect, Russell Gill, gave a brief talk on the aims and plans for the year 1948. He called for a short meeting immediately after the program to arrange the dates for the 1948 meetings.

Respectfully submitted,
HOWARD M. WADDLE, *Secretary.*

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Meeting, New York Section

A MEETING of the New York Section was held on Friday evening, December 5th, at Kohler's Swiss Chalet, Rochelle Park, New Jersey. An informal dinner preceded the meeting.

The report of the Nominating Committee, consisting of Patrick J. Kennedy, Chairman, Robert E. O'Hara and George L. Baxter, was presented by its Chairman. The following new councilors, as nominated by the committee, were unanimously elected: William A. Holst, National Aniline Division, Allied Chemical & Dye Corp., Francis S. Richardson, Waldrich Co., and Charles W. Dorn, J. C. Penney Co., Inc. These councilors replace Leonard S. Little, Thomas F. O'Brien and Patrick J. Kennedy who have completed three successive years in office.

Three papers were presented during the technical program as follows:

"Dyeing and Fastness Characteristics of Aqueous Chlorinated Wool": the New York Section's entry in the Intersectional Contest which was awarded third prize. A resume of the paper was given by Dr. Alfred L. Peiker.

"A Study of Nylon Dyeing: Effect of Dyeing Procedures" by Louis I. Fidell, George L. Royer and Henry E. Millson of the Calco Chemical Division, American Cyanamid Company. This paper was originally presented at the Chicago National Convention and Mr. Fidell presented a resume of it at our meeting.

"Evaluation of Detergents for Wool Scouring Processes, Laboratory Method" by E. A. Leonard and A. R. Winch of Alexander Smith and Sons Carpet Company. This paper was presented by Mr. Leonard.

The total attendance was approximately 275.

Respectfully submitted,
NORMAN A. JOHNSON, *Secretary.*

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EMPLOYMENT REGISTER

This column is open for four insertions per year, per member, without charge. Blanks can be obtained from, and filed with, the Secretary of the Association, Lowell Textile Institute, Lowell, Mass. It is understood that these will be open to inspection by prospective employers, who can obtain further information from the Secretary.

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47-39

Education: B.T.C., Lowell Textile Institute, 1936.

Experience: Textile chemist, operator of dyeing and finishing equipment, laboratory manager and inspector, manager of dyeing plant.

Age, 35; married, references.

47-40

Education: B.S., Rensselaer Polytechnic Institute; M.A., Columbia.

Experience: Organic chemist, petroleum inspector in Army of U.S., dyehouse chemist, formulation and testing of textile specialties.

Age 35; married; references; position in northeast U.S. desired.

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CALENDAR

PHILADELPHIA SECTION

Meetings: January 9, 1948, February 27, April 9, May 14 (Kugler's, Philadelphia).

NEW YORK SECTION

Meeting: January 23, 1948 and March 12 (Hotel New Yorker, N. Y.).

PIEDMONT SECTION

Meetings: February 7, 1948 (Poinsett Hotel, Greenville, S. C.); April 3, 1948 (Robt. E. Lee Hotel, Winston-Salem, N. C.); June 18, 1948 (Ocean Forest Hotel, Myrtle Beach, S. C.).

RESEARCH SUB-COMMITTEES

Meetings: January 8, 1948 (Downtown Athletic Club, New York).

COUNCIL

Meeting: January 9, 1948 (Downtown Athletic Club, New York).

RESEARCH COMMITTEE

Meeting: January 9, 1948 (Downtown Athletic Club).

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Dinner for Corporate and Charter Members

National Convention, Chicago, October 23, 1947

AL J. FEIT, Chairman of the Mid-West Section, opened the ceremonies following the dinner on Thursday evening, October 23rd, with a welcome to Chicago, and introductions of those at his table including Past President P. J. Wood, Toastmaster. Drawing the whole audience into his own genial mood with song and story, Mr. Wood first introduced Harry A. Toulmin, Jr., as follows:

P. J. Wood: I have here the record of the first speaker. If I don't read this quickly, there won't be much time for him to speak.

He is a graduate of the University of Virginia and of the Law School of Ohio State University. He had a partnership in the firm of Toulmin & Toulmin, Dayton, Ohio, the other member formerly being his father, now deceased. His father was a specialist in patent law and handled patents on the airplane for the Wright Brothers. The son continues as one of the country's outstanding patent lawyers.

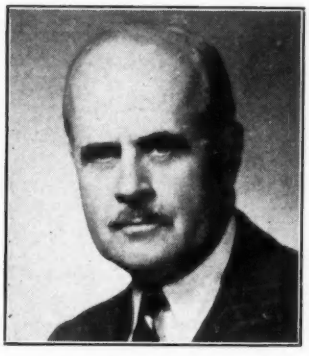
He is also a veteran of two wars. During the first war he was Chief of Staff of the Air Corps in France. In the second World War, he was Assistant Chief of Transportation for Supply. He was also assistant to the Commanding General, Air Service Command, and in charge of the Atlantic Overseas Command and the Pacific Overseas Command of the Air Force. He received the Distinguished Service Medal. He was a member of the Army Pearl Harbor Board, its Executive Director and author of its report.

He directs sixteen different corporations, in addition to his patent law office, so I think we can class him among the busy men. He owns the Commonwealth Engineering Company, which, as many of you know, does research work for diverse corporations in many fields. It gives me great pleasure to introduce Colonel Toulmin!

Mr. Toulmin then spoke on "An Industrialist's Patent Policies."

An Industrialist's Patent Policies*

COL. HARRY A. TOULMIN, JR.



Col. Toulmin

I AM going to discuss tonight the subject of patents in connection with industrial work. The question of patents for an industry such as this can either be a technical and theoretical one, or it can be a practical approach to the problem. I would like to talk to you as one businessman to another rather than as a lawyer specializing in patent law and the anti-trust laws, because I think if we get at this thing on the basis of how to make money out of research and out of patents, we will be approaching a thing that will bring some results for the thirty minutes you have to sit here and suffer.

Now the thing the public is looking to in industry today, is this. Are we as representatives of the capitalist system contributing to the public welfare? And I know of no place where attention is focused more carefully today on each industry, than upon its research program, and upon the way it handles its patents, by the industry as a group, or by individual companies, in a constructive way for the public interest.

Patents in the United States were the foundation of our government, before we had the American Revolution. The Revolution was fought, and one cause of it was the fact we were trying to get from England the right to invent and the right to manufacture as we pleased. When the Federal Constitution Convention was held in Philadelphia, the one provision of the Constitution that went in without objection was the provision for patents, because the founding fathers knew that the foundation of the prosperity for this new nation, if it was going to become a great industrial nation, would rest in the subject of patents and manufacturing.

Now to have a successful research program, in my experience as an industrialist, it is necessary to have some means of getting back that investment and of protecting the results of research when you go into manufacturing and merchandising, I don't know of any way by which you have some hostage to fortune except through the patent route. When you have this protection for seventeen years, or some part of it, you have some way of insuring your investment against being purloined by competitors who are more interested in a quick profit than they are in building an industry or building a reputation. So first you look to a patent as you would an insurance policy, to amortize your investment in research, development and engineering work.

In the second place, if you protect your patent property correctly, with the right policy, you may be able to license and cross-license your neighbor. In many industries, and in many companies I represent, we have converted our research and engineering departments from overhead into profit-making institutions. Anybody who has to watch the balance sheet, I think, will find this a thing of great importance.

So when you look at a patent, you must look at it as not just a piece of paper with a nice red seal and a blue ribbon on it, to last for seventeen years, but as something you can make some money on; and that is the only justification for it, that it is a weapon of competition. It can be used to put the other fellow behind the eight ball.

* Address at dinner for Corporate and Charter Members, National Convention, Chicago, October 23.

The week after next I will argue a case here in the United States Circuit Court of Appeals for a company that has dominated an industry for seventeen years with a pair of patents. We have been successful in controlling the industry with those patents. We have gotten the benefit of them. Now that is the modern method of pushing patents to the fore when you want to compete in an industry.

The second principle I want to talk to you about is this. You know in this country, despite the Democratic administration, we still have the right to fix the price of our competitor's product under a patent license. I have a number of industries where I fix the price for the entire industry under a group of patents. We so fix it that we make a profit. Everybody in the industry has to make a profit.

Now if the government is willing to give you a monopoly for seventeen years; and is willing to let you fix the price of your competitor so he can't undercut you, by the simple expedient of giving him a license and controlling his methods of operation, I think that is a gift from heaven that is untaxable and should be taken advantage of. When patents are approached from that practical point of view, I have seen many industries converted from a cutthroat, loss competition, to one of rich and lasting profit; and if the management of such groups is intelligent, it will be careful not to impose upon the public but to give it a fair price, and to continue to increase the public interest by contributing a great deal to research and development work.

We are coming now, in the next few years, we hope, to an era of imports from abroad. In times past, this particular industry has been particularly concerned with certain types of imports. We find that with patents we are able to control the imports of competition that are based upon production of low-cost labor from abroad. Here is another factor in patents that is useful in this strategy of competition.

This sharing of technical information through international contracts is an industry matter. If any of you are interested in this particular subject, I wrote a book that came out this spring, was introduced by Senator Homer Ferguson of Michigan, on the subject of international contracts with respect particularly to the anti-trust laws. You will find in a book of that sort the guide for the negotiation and drafting of international contracts.

This business of controlling competition from abroad by contracts is an extensive operation. In many industries the very livelihood, the very lifeblood of the industry, depends upon the control of competition in normal times from abroad; and under patent licenses it is possible to do that, to so regulate competition, and to so exchange technical information (despite the difficulties with Mr. Arnold), that we are able to build an industry in this country second to none, and to withstand cheap labor competition from abroad.

The final thing I want to talk to you about before I come to the anti-trust laws, as a warning, because it is a dangerous spot with patents, is this question of trade secrets. In an industry such as you have, I do not doubt that a large proportion of your technical developments are maintained as trade secrets. The government, through its various laws, frowns upon trade secrets. It is against the policy of the courts to protect trade secrets except as a last resort, when the owner of the trade secret has taken every possible precaution to preserve the development as a secret.

I have had occasion to try a number of cases in the chemical and color industries on the subject of trade secrets. That experience has led me to the conclusion that it is a rare case where the owner of the trade secret can preserve it, because when the lawyers get through with the contest, usually everything that is secret becomes public. The law requires you, with a trade secret, not only to preserve it in the knowledge of a limited few, but to preserve all the regulations for security that are characteristic of what we call, in the Army, "top security." And top security in the Army means a document that is never seen by a woman. (Laughter) There must be some husbands here. (Laughter)

I am serious on this subject of trade secrets, Gentlemen, because if you attempt to protect your ideas by trade secrets and hold them to yourselves (and in many cases that is very desirable), you want to remember that you thereby abandon any rights to patents on that particular subject; and having committed yourself to that course of action the consequences are that you must undertake, on your own behalf, this same sort of policing, privately, that the government provides for you under patents, publicly. Your research security, therefore, will depend upon your plant security in maintaining your trade secrets.

There is one way to get around this, to have your pie and eat it too. This policy, I think, is one of great importance. Many companies follow it, and I was able to get the principle established by the Supreme Court of the United States in a case I had there in 1942. It is this. You can file an application for a patent on a thing that you wish to maintain secret in the Patent Office, where it is being held secret; and then abandon it and not prosecute it to a patent. That application will remain in the patent office files for twenty years and then be destroyed.

The advantage is that you establish your right to the idea. You will be able to prove that you were the first to do it, in case you have to prove that fact because you are sued. And you are able, therefore, to preserve, by public record, kept in a secret manner, your right to the particular idea; so if anybody else should hit on the idea and get a patent on it, you can pull out this secret file from the Patent Office to prove you were first, and defend yourself from infringement suits.

That reminds me of one other principle, a case that I am going to argue in the Supreme Court of the United States in December, that came up from the Circuit Court of Appeals here in Chicago, recently, on a very fundamental matter affecting not only the patent law of the United States but national security; that is, the extent to which scientific discoveries can be patented.

There is a set of rules of the government that you cannot monopolize, by a patent, a scientific fact or a scientific discovery, or a law of nature. The Court of Appeals, in this Circuit, reversing the lower court, recently held that it was possible, in connection with a bacteriological job, to monopolize, by patent, for seventeen years, the action of bacteria, which actions were only those of the law of nature. That question has been ordered up by the Supreme Court of the United States in view of its importance, without any conflict of circuit. To my knowledge that is the sixth time it has been done, and it indicates the importance to the Government of the United States of having that principle settled.

In conclusion, let me say just a word about the subject of the anti-trust laws. There are two separate branches of the law. The patent law provides for a monopoly for seventeen years. The anti-trust laws, that is, the Sherman Act and the Clayton Act, and the associated acts, provide against monopolies. Somewhere between them there must be a compromise. That conflict raises the issues in most of the anti-trust suits.

There is scarcely an industry in the United States that is not under indictment today for violation of the anti-trust laws. I don't think there is a single company of any consequence that has not, in the last five or ten years, either been indicted or sued under the anti-trust laws of the United States. The Federal Trade Commission has contributed its quota of the same thing, so that it is a very important matter to know how far you

can go.

The simple rule to be followed by an executive is not to step out of the rights the Patent Law gives you, in order to acquire additional commercial rights which the Patent Law does not give you. To be specific it means this. You cannot control the other man's production under a patent, because that is a purely commercial matter. You cannot agree with the other man on the price at which we will sell under a license. You can tell him, as the owner of the patent, at what price he must sell, but you cannot agree with him, as to the price at which he shall sell.

I remember some years ago, in connection with the lacquers that duPont was licensing, and they did license the industry; that after they had signed up twelve large compaines, one of our clients received this license, and I discovered that the duPont Company had left in its contract the provision that the price would be agreed upon between the licensor and the licensee. I pointed out to my dear friend, the late Mr. Spruance, that we would rather trust duPont to fix the price than trust the Department of Justice not to put us in jail. So he changed it and kept out of trouble.

That illustrates one thing. If you get into trouble with the Department of Justice of the United States with patents it is your own fault. You can do everything you want to do, and do it fairly in the public interest and your own interest, if you will phrase your documents, contracts, and agreements in the way the law provides. Ninety-nine per cent of all anti-trust actions come from the fact either that the lawyers were not competent, or that they were not consulted. You can do about everything you wish. All you have to do is to use the right words, or the right procedure. The reason why so many people get into difficulty is that the invasion of the anti-trust laws is usually an artificial one that businessmen do not appreciate or understand.

In conclusion, Gentlemen, let me say that if you get your patent policies correct, coordinate them properly with your research program, limit your patents to those things that are substance and not the immaterial things, overrule your patent lawyers and their foolishness of getting in all their mumbo-jumbo, reduce the thing to a practical basis, and utilize your patents for the purpose of making money, you will find them a rich investment. Otherwise, you will find them very disastrous to handle.

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Mr. Wood then introduced J. Robert Bonnar, Chairman of the Association's Executive Committee on Research, who discussed the research activities of the Association in an address entitled, "Gearing Toward Better Textiles."

Gearing Toward Better Textiles*

J. ROBERT BONNAR

Chairman, Executive Committee on Research, AATCC
Technical Director, General Dyestuff Corp.

Mr. Bonnar

IT GIVES me pleasure to represent the Executive Committee on Research tonight, and to take several minutes to give you quickly a resumé of the endeavors, accomplishments and plans of the Research Committee of the AATCC. It is realized that you are busy executives and do not have the time nor the desire to follow individual detailed reports as are published from time to time, giving functions of our various phases of investigation. Your collective support, however, of nearly fifty-thousand dollars a year entitles you to know in a general way what you are receiving for your money.

I fully realize that it is particularly boring to sit and listen to the reading off of long tables, charts, and figures of expenditures. Nevertheless, I must resort to this means of getting my message across to you inasmuch as it is the only way of explaining the vast amount of thought, energy, and work done by the Association for its members and corporate members, as well as the industry at large. I likewise realize that you will not remember in detail the figures, but I trust that you will gather the impression that your money is being well spent—as it really is.

The Association, made up of some five thousand members is, as you know, entirely technical, with of course, the side social events which must necessarily be attached to any organization of its kind. Any organization such as ours naturally is slow in starting, as the members are few, ideas have to be developed, and then the functions so coordinated as to get proper results. It is realized that twenty-five years have gone by, but a vast amount of work has been done, and just as in ordinary business, changing times, changing commodities, and changing demands make for revised stadards, testing methods, and type of work carried out.

There is no question but that the AATCC should have had more workers in its research committees than it has done in the past. This is, however, extremely hard to overcome as members are particularly reticent in offering their services, especially among the newer members who feel that older members do not want them as part of their groups. It is, nevertheless, interesting to note that on just the active committees, without any accounting for reference committees, they are composed of men who have worked very diligently on their particular phase of the research. These men represent the following profesions: dyestuff manufacturers, chemical manufacturers, educational institutions, sales, trade associations, testing laboratories, textile processing plants, which latter naturally can be broken down further into cotton, rayon, wool, as well as again into laboratory, research, and processing. It is the endeavor of your executives in setting up new committees to obtain cross-sections of all people who can contribute to the work, as well as seeing to it that present-in-force committees are flexible enough to have new members added as occasions arise.

Now come the figures which, as I said before, you are not expected to remember, but which are factual data to allow you to better visualize the tremendous amount of volunteer work which has been put into the Association. Taking from the forty-odd committees, only eleven active committees, which comprise 131 active and 86 cooperating members, these men traveled 125,001 miles, (which sounds almost like the national debt), and have donated of their companies' time and their own time (for which percentage breakdown is not available) 19,340 hours during the past year. This same group ran 63,944 individual tests. To put this another way, this would mean that one of your paid

* Address at dinner for Corporate and Charter Members, National Convention, Chicago, October 23.

executives would have to travel between New York and Washington round trip, and back to Washington from New York every working day for a full year to make up for this mileage. You can draw the parallel on the hours for yourself. Naturally, some members have not contributed too much, but to show the tremendous contribution of volunteer work, the total value of some eight-thousand miles and some four hundred hours has been piled up by one member.

The Research Committees have endeavored to do for the textile industry what no other organization in existence in the country is set up to do. They have tackled problems covering light fastness, wash fastness, dimensional restorability, gas fading, flameproofing, and the like, and if it were not for the AATCC having such active committees and doing such splendid work, you can well imagine what individual members would have to face in talking quality goods with no yardstick to use.

Taking water resistance testing as one of the best examples, there are some twelve or thirteen, perhaps more, available methods of test, none of which has been universally accepted. The AATCC has just accepted a new tentative test method which has been worked out after considerable investigation, the majority of the work of which has been donated to AATCC by one of the large chemical manufacturers. This, it is hoped, will clarify the situation. Where would the industry be in matters of standardization of materials and specifications of materials should the buyer in one case talk one machine, the manufacturer another machine, and the processor talk still a third machine.

It is true that up until the last five years, or perhaps even three years, the majority of the AATCC standard test methods have been set up so that evaluation could be made of one product versus another product. Of late, however, the work has necessarily turned to end use correlation. In other words, with such a trend toward fast colors, the tremendous amount of use of brand names and the apparently fast approaching obligatory fastness labeling, it can be well realized the confusion which would arise should not the standard test methods show approximately the same results as some arbitrary figure of 5, 10, or 20 home launderings, for instance, when thinking of wash fastness.

This is the nature of the work which the AATCC is doing for you at a very small fraction of the cost which it would take each and every corporate member in his own laboratory to set up and get into proper form, and which even then would hold no water when talked about with cuttersup, consumer organizations and the like.

You can well imagine, for instance, turning over to your technical department, or to engineers, the problem of developing a machine which simulates light fastness. I dare say no two people would use the same type of light, nor would the moisture be taken into account, nor the hours of fading be found comparable one test with another. The AATCC has developed a lamp for better uniform fading. I say "'better uniform fading" advisedly, as it must of course be admitted that this standard lamp is still not perfect, but the variations obtained are only a fraction of those which would be obtained by you, Mister Corporate Member, or you, Mister Corporate Member, should you attempt to use a fading lamp of your own making, or more particularly, should you put the samples into the sunlight when certain cloudy days will fade faster than certain bright days, and you try to judge the strength of the sun by your own measurements.

The Research Committee, confronted with so many problems of such magnitude and scope had attempted to take on new blood in order to spread the work, but had met obstacles. Human nature is such that the majority of people, and this the committee also found to be true of our organization, are loathe to offer their services and are just as reticent about offering to the Research Committee subjects or problems that they believe their Association should be working on.

In light of this, the organization was polled by means of a General Questionnaire as to the type of work individual members are interested in, type of work their organizations are interested in, and the type of vision concerning future work which AATCC should be carrying out for the good of the industry. These questionnaires are right now coming in very fast and with a wealth of information. They show that there is a vast amount of willingness to contribute time, knowledge and facilities and it is now up to the powers-that-be to draw on this. I assure you that such will be the case. The Questionnaire answers show that there is interest in all phases of textile processing, with about equal importance in each phase, and examples are:

Dye chemistry and dye application problems
Clearing house for ideas
Understanding of garment dyeing (we have neglected our members in this field)
Hosiery dyeing problems (we have also neglected these people until recently)
Stain and soil resistance
Nylon hosiery dyeing
Better correlation of test methods with end use
Size application problems
Further mercerizing studies
Data on new textile machinery
Abrasion and wear resistance study
Have advisory committees on each processing step in industry
Study wool lubricants
Study variation in roll consistency and pressure variation in piece goods padding
Evaluation of penetrants
Variation in dyeing processes with respect to fastness
Effect of bottoming on final quality
Static control
Effect of resin finishes on light fastness

This list, for sake of brevity at this time, is only a partial one, but full and complete reports on valuable problems will be drawn up at a later date. The working on such problems as these, even though they are not carried on to an expected conclusion, will without question raise the standards of the industry and will lead toward better textiles from an industry-at-large point of view.

You do realize that Government Bureaus put out specifications and standards. You do not realize, however, that the majority with which you have to deal and which you accept without thinking of the work behind them are either taken in body from the work done by your Research Committee or are set up through cooperation with your Research Committee. At the risk of offending, but with all due respect to Government Research Bureaus, they can, without question, not be as thorough nor as practical, because the men themselves do not have firsthand information, due to not being a part of the industry, whereas those set up by AATCC are set up by your employees and your associates, who, although working absolutely in a neutral way, nevertheless realize the pitfalls which they have to guard against.

These results mentioned previously are only with respect to a few cases, of which there are many, and are the tangible results of the Research Committee. It is, of course, impossible to have all of the work done by volunteers on any committee which geographically is spread throughout the country, or as far as Boston to Savannah. In addition, and what is even more important, certain types of investigations do not lend themselves to breaking down into several different laboratories.

It is thus compulsory that the AATCC have paid workers doing the type of work which it is impossible to dole out to volunteers, and the funds that you make available are used for this purpose at a central station, with tentacles reaching in-

(Concluded on Page P774)

Fundamental Research Group Meeting—

Some Aspects of the Ageing of Coated Fabrics*

E. V. PAINTER
Fabric Research Laboratories, Inc.

COATED fabrics are composed of two separate systems which differ from one another both chemically and structurally, one system being a continuous flexible film and the other an intermittent structure of individual fibers and yarns. The ageing of coated fabrics is a result of the effects of (a) the individual resistance to degradation of each system, and (b) the interaction of the two systems. The first factor depends upon the inherent chemical nature of each system, while the second factor determines the extent to which each system controls the final result.

The interaction of the two systems is at present the least understood property of coated fabrics. It is affected by the geometrical position of the film *on*, and/or *within* the fabrics, as well as the support, protection, or interference each system affords the other.

The action of the film on the fabric is commonly regarded as such that the tear strength of the coated fabric is less than the original fabric alone. Ageing of coated fabrics usually causes a further reduction in tear strength, often so rapidly that the useful life of the coated fabric is quite limited in this regard. It is generally felt that the stiffening of the film upon ageing is responsible for this effect and thus defeats, to a certain extent at least, one of the two major purposes for coating the fabric; namely, waterproofing and protection of the fabric.

Determination of Film-Fabric Interaction

The rupture of a textile sample by application of a load is usually accompanied by the movement of neighboring yarns in relation to one another within the fabric[1, 2]. The restriction of this movement by the presence of the film causes the coated fabric to have different stress properties than the uncoated.

This inter-yarn movement in uncoated fabrics may be slight and due only to crimp interchange [3] in an ordinary tensile test, or it may be quite extensive in a tear test[1]. Any tear test may be considered as a tensile test associated with geometrical distortion and stress concentrations, and the trapezoid tear test has in one case been analyzed on this basis[3]. The tongue tear test involves much more distortion than the trapezoid test, however, and has yet to be completely analyzed, although steps have been made in that direction[1]. It is at best a very complex problem involving the inherent stress-strain properties of the individual yarns and the geometry of the weave as well as its distortion. The addition of a restricting film serves to complicate matters even further. It was necessary, therefore, to determine the effect of the coating by indirection.

The tensile[4], and also the tear properties of the fabric, both with and without the coating can be measured and the net effect of the coating obtained by difference. It would seem logical that the film-fabric interaction would be greatest in association with the greatest yarn movement or fabric distortion. Since this is the case with tongue test, it was therefore performed on samples of coated fabrics both before and after removal of the coating.

Additional samples were treated in a similar manner after exposure to various types and degrees of ageing in order to stiffen the coating. No particular emphasis was placed on the selection of types and degrees of ageing other than to conform in general to past practice. The principal purpose was to secure both slight and extreme degrees of degradation due to ageing.

Test Methods

All tests were performed on an Electronic Tensile Tester. The tester is illustrated diagrammatically in Figure 1. The deflection of the strain gage cantilever under load is negligible in comparison to ordinary sample extensions. The pulling jaw moves downward at a constant speed

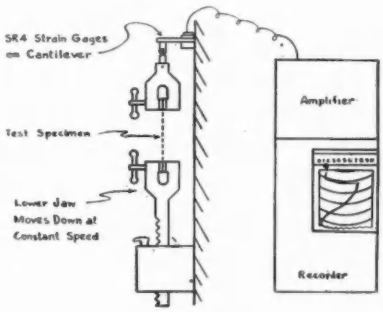


Figure 1
Electronic Tensile Tester

resulting in a test performed at a constant rate of extension. The load on the specimen is measured by means of the Baldwin-Southwark SR4 strain gages on the cantilever[7]. The gages produce a voltage which is linear with the load on the cantilever. This voltage is amplified and then recorded on a suitable recorder, in this case an Esterline-Angus Graphic Ammeter, Model AW. The recorder chart moves forward at a constant rate of speed and the pen deflects across the chart in accordance with the load on the sample. A graph is thus obtained of the load vs. elongation of the sample and hence the test as it is extended to rupture. The ratio between the recorder chart speed and the pulling jaw speed can be arranged in order to magnify the elongation scale if so desired.

All samples for all tests were conditioned for at least 24 hours and tested at 70° F. and 65% R.H.

All strip tensile tests were made in accordance with the ASTM Designation D39-39, Sections 11 and 12 for the Raveled Strip Method on uncoated fabrics and the Cut Strip Method on the coated fabrics. The pulling jaw speed was 6 inches per minute in all tensile tests. Ten samples were tested for each value reported. The average load elongation diagram was obtained by averaging elongations at convenient load intervals from zero to rupture. The area under this average curve was planimetered and converted to the

* Excerpts from a research program sponsored by the Plastics Section, Research and Development Branch, Office of the Quartermaster General. Presented at Fundamental Research Group Meeting, Dr. Leonard Armstrong, Presiding, National Convention, Chicago, October 24, 1947.

energy to rupture in inch-pounds per inch of gage length.

The tongue tear tests were made in accordance with the ASTM Designation D39-39, Section 15, except that the Electronic Tester was used. The pulling jaw speed was 3 inches per minute. Prior to the test, marks 1 inch apart were placed on the sample along the line of tear. The recorder chart was then marked during the test as the tear proceeded through each mark on the sample.

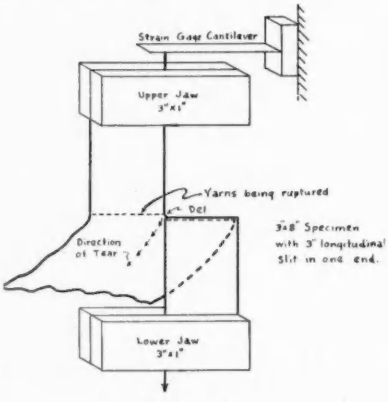


Figure 2
Diagram of Tongue Tear Test

Figure 2 illustrates the tear sample in the jaws. It can be seen that due to the doubling back of the tails, 2 inches of jaw travel should be required to tear 1 inch of original fabric. However, correlation of the marks in the chart and sample just described indicated that the jaw travelled slightly more than the necessary 2 inches. This extra length can be accounted for roughly by the straightening of the crimp (and to some extent stretching) of the yarns in the tails which are not being ruptured. Table I shows the results of correlating crimp in the cross yarns with extension in the tails. The discrepancies are very likely due to the fact that in one case (GRS Nylon) crimp is removed and in addition the yarns are stretched somewhat, while in the other case (Perbuana SC Cotton) the crimp is not quite all removed.

Figure 10 shows typical load vs. elongation chart records for the tongue tear test on the Electronic Tester. These diagrams are somewhat similar to those obtained on an autographic pendulum test, except that the load values are not influenced by the inertia of the pendulum swinging back and forth during the test. Furthermore, the jaw spacing does not vary back and forth with the load as in the pendulum test, but increases at a steady rate regardless of load.

The interpretation of the tongue-tear diagram has been discussed by Krock and Fox[1]. They suggest that the tearing load be averaged on an energy basis, disregarding the initial stretch before the tear commences. They did not take into account the extension of tails mentioned previously, but it would be virtually impossible to measure this value on the ordinary pendulum test. Neglecting this effect results in an average load which is high by roughly the percent of crimp in the yarns opposite to those for which the load was computed.

TABLE I

Tongue Tear Test
Extension of Tails Formed by Tear vs. Crimp
Original Unaged Fabrics

Fabric	*Yarns Torn*	*Yarns in Tails*	*% Crimp in Yarns in Tails*	*% Extension of Tails*
GRS Coated Nylon	Warp	Filling	7.0	12.0
	Filling	Warp	2.8	9.0
Nylon Alone	Warp	Filling	7.0	19.0
	Filling	Warp	2.8	12.0
Perbunan SC Coated Cotton	Warp	Filling	16.0	12.0
	Filling	Warp	4.1	1.0
Cotton Alone	Warp	Filling	16.0	10.5
	Filling	Warp	4.1	1.5

In the present work, an average tear load was not considered as informative as tear energy, since the latter expresses the result of load and elongation, both of which could be affected by film-fabric interaction, and it is desirable to compute a single index to express the net change due to stiffening or ageing. The tear energy is simply the area under the load-elongation diagram between two successive marks as described above, and is thus a product of the average load on the pulling jaw times the distance the jaw moved in order to tear one inch of original fabric. The units are thus inch-pounds per inch of fabric.

Another index of tear resistance which may be of interest is the average upper peak load, averaged on a simple number basis. This is the value of a dead load which, on the average, might be expected to start a tongue tear. It is naturally related closely to tear energy and is affected by ageing in much the same manner as the energy.

The types of ageing used were as follows:

1. Oven ageing was at 220° F. in an electrically heated oven with a small amount of make-up air added continuously.

2. Weather-o-meter ageing was carried out in a National Weathering Unit, Type X-1-A, with Corex D filters in place.

3. Outdoors ageing was accomplished by mounting samples on inclined racks on the roof of the building occupied by the Fabric Research Laboratories, Inc., in Boston, Mass. The samples were inclined about 75° to the horizontal and faced in a southerly direction. The ageing periods reported herein both commenced on January 15, 1947.

The accelerated ageing methods were carried to extreme degrees in order to produce pronounced stiffening and degradation effects. No correlation of types of ageing with one another, or with service testing is intended.

Materials Tested

The selection of materials was aimed at obtaining wide differences in properties and structures. Since the general purpose here is the development of test methods, the properties of any particular fabric or coating are merely incidental to the desire that they are representative of classes of materials available.

Cross sections and descriptions of the two coated fabrics used are given in Figure 3. It can be seen that one is a 4.7 oz. cotton sheeting with a 5.5 oz. coating, while the other is a 2.1 oz. nylon twill with a 3.6 oz. coating. The former was calender coated so that the coating merely adhered to one side of the fabric, and the latter was knife coated so that the coating penetrated into the yarn interstices and covered both sides of the fabric. The materials are thus representative of wide differences, especially in the extent of film-fabric interaction.

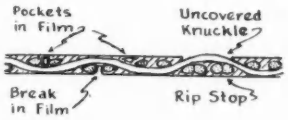
Removal of the coatings being studied could not be affected by simple solvent extraction. The GRS coating was removed from the nylon by soaking the coated fabric in a solvent overnight and then rubbing the swollen, crumbling rubber off the fabric. The rubbing action was performed with a soft chunk of rubber or a rubber glove. The extent of rubbing required on the unaged samples was quite mild and was only slightly more severe for the oven aged samples. Typical samples observed under a microscope for damage to filaments indicated no appreciable disturbance.

The Perbunan SC rubber coating was peeled gently from the cotton fabric for all samples except the 400 and 800 hour oven stations which had to be soaked

CONSTRUCTION

	Fabric Alone	Coated Fabric
WEIGHT, OZ./SQ.YD.	4.7	10.2
THICKNESS, 10^{-3} IN.	10.4	16.1
THREAD COUNT, WARP	59	60
FILLING	56	54
CRIMP, PERCENT, WARP	4.1	
FILLING	16.0	
YARN NO., WARP & FILLING	25's	
WEAVE: PLAIN		
METHOD OF COATING: CALENDERED		

PERBUNAN SC COATED COTTON



	Fabric Alone	Coated Fabric
WEIGHT, OZ./SQ.YD.	2.1	5.7
THICKNESS, 10^{-3} IN.	6.3	7.8
THREAD COUNT, WARP	83	83
FILLING	83	80
CRIMP, PERCENT, WARP	2.8	
FILLING	7.0	
YARN DEN., WARP & FILLING	90	
WEAVE: 2,1 TWILL BOTH WAYS, WITH 4 DOUBLE-SIZE YARNS EVERY 9/16" BOTH WAYS FOR RIP-STOPS.		
METHOD OF COATING: KNIFE-SPREAD		

GR-S COATED NYLON

Figure 3

TABLE II

Strip Tensile Test
Load Elongation and Energy at Rupture
Original Unaged Fabrics
Averages of 10 Samples Each

Fabric		*Load Pounds*	*Elongation, Percent*	*Energy, in. lbs./in.*
GRS Coated Nylon	Warp	83.6	29.3	11.31
	Filling	69.0	34.8	9.22
Nylon Alone	Warp	80.0	26.0	9.74
	Filling	70.4	31.8	8.83
Perbunan SC Coated Cotton	Warp	42.0	6.7	1.27
	Filling	33.5	24.2	2.24
Cotton Alone	Warp	40.4	7.6	1.35
	Filling	35.1	24.7	1.97

TABLE III

Tongue Tear Test
Average Maximum Load and Energy per Inch Fabric
Original Unaged Fabrics
Averages of 5 Samples Each

Fabric		*Ave. Max. Load, Pounds*	*Energy Per Inch Fabric In.-lbs./in.*
GRS Coated Nylon	Warp	8.08	12.27
	Filling	6.38	9.36
Nylon Alone	Warp	5.20	10.73
	Filling	5.60	10.15
Perbunan SC Coated Cotton	Warp	2.39	4.99
	Filling	1.95	3.26
Cotton Alone	Warp	2.45	4.71
	Filling	2.18	3.88

overnight in the above mentioned solvent to soften the rubber coating, after which it was removed in the same manner as for the nylon. No appreciable damage was indicated on these samples.

The solvent used on all samples was a mixture containing equal parts of Morpholine, 2-nitropropane, ortho-dichlorbenzene, and Tetralin.

Test Results

A. Properties of Unaged Fabrics.

The tensile properties of the original unaged fabrics, with and without coating, are given in Table II. It is evident from the Table that the effect of the coating is to cause a slight increase in the warp strength and a slight decrease in the filling strength. Not much significance may be attached to these differences, however, since the average variability (standard deviation divided by the mean) was approximately 6 to 8 percent. Thus, for 10 samples at the 95% probability level, any differences less than the variability are not statistically significant. However, the differences shown would be expected from a stress analysis point of view with the following reasoning: Simple geometry indicates that the more a yarn of a given breaking strength is inclined to the direction of pull, the less load will be registered in the pulling direction at break. In the tensile test of an uncoated fabric, the yarns being loaded are considerably straightened by the load and their crimp transferred to the cross yarns. The presence of the coating restricted the ordinary straightening of the highly crimped filling yarns and thus caused a lower filling-wise break for the coated fabric. The warp yarns had very little crimp to begin with and there was very little or no additional straightening for the coating to restrict. A 1 inch strip of the Perbunan coating peeled from the cotton tested about 2 pounds at break with an extension of about 400 percent. The coating was therefore able to contribute slightly to the warpwise strength of the coated fabric. This line of reasoning is substantiated in the ageing tests reported below.

The tongue tear tests results are given in Table III. It is evident that the presence of a coating on a fabric does not always produce a decreased tear strength. The variability among samples for these tests was approximately 7 percent and 5 samples were averaged in each test. The minimum significant difference is therefore about 10% at the 95% probability level. It is evident, then, that the Perbunan coating on the cotton actually reduces the filling tear load and energy somewhat, but does not affect the warp tear values. The GRS coating actually increases the nylon tear load in both directions and the tear energy for the warp, but decreases the filling tear energy by an amount that is of doubtful significance. The increased warp tear values are caused by a somewhat different tearing action in the constant rate of elongation test than is encountered in the usual pendulum or Elmendorf test. More time is allowed for

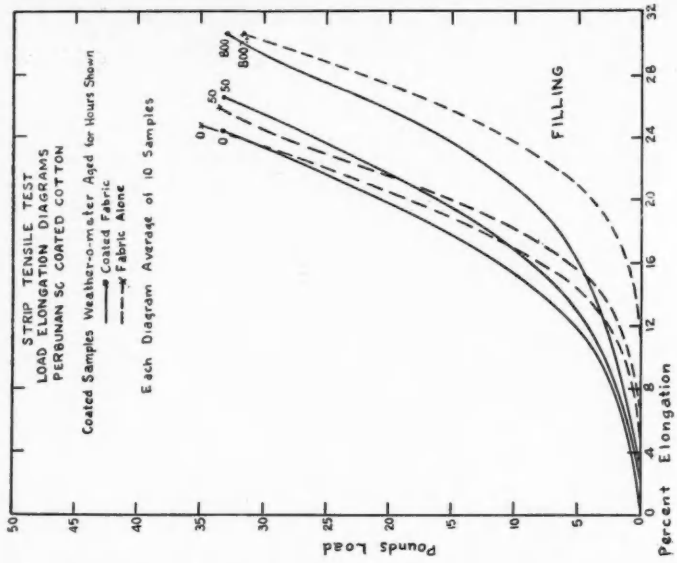


Figure 5

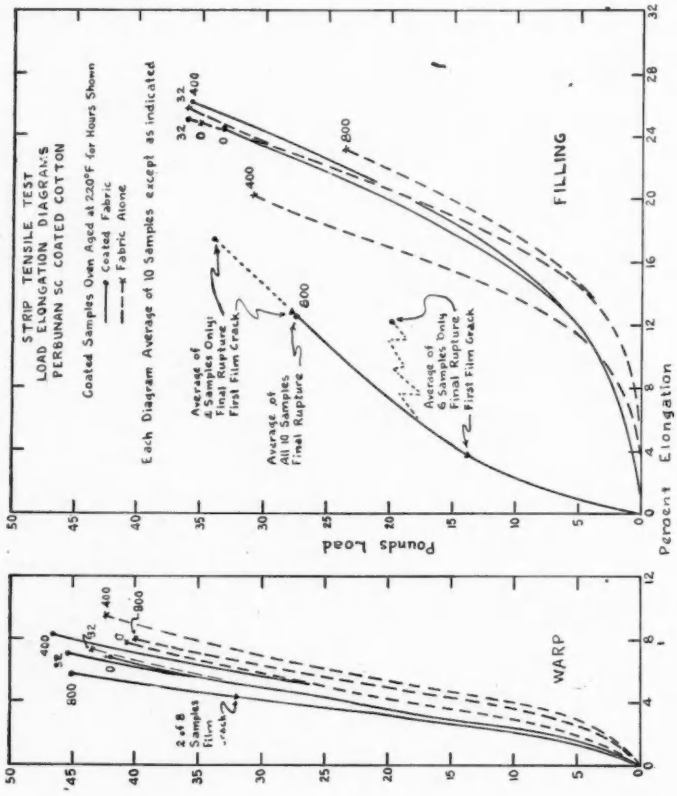

STRIP TENSILE TEST
LOAD ELONGATION DIAGRAMS
PERBUNAN 5C COATED COTTON
Coated Samples Oven Aged at 220°F for Hours Shown
Coated Fabric
Fabric Alone
Each Diagram Average of 10 Samples except as indicated
Average of 4 Samples Only Final Rupture First Film Crack
Average of All 10 Samples Final Rupture
Average of 6 Samples Only Final Rupture First Film Crack
2 of 8 Samples Film Crack
FILLING
WARP
Pounds Load
Percent Elongation

Figure 4

stress distribution, and a coating such as the GRS that extends completely through the fabric and binds the yarns together probably distributes the stresses even further through the fabric than when it is not present, resulting in more yarns being pulled into the distorted zone at once and thus holding a higher load before each rupture. The coated samples appeared somewhat more distorted along the line of tear than the uncoated, and considerably more distorted than similar samples torn on other machines.

B. Effect of Ageing

Ageing of rubbery materials is known to consist of two opposing mechanisms: (1) further cross-linking or "vulcanization" and (2) the rupture of existing chains and cross-links. The former process produces a stronger material while the latter naturally has a weakening effect. The former process usually dominates in the initial stages while the latter becomes appreciable only after the first has run its course. These factors make themselves evident in the tensile tests results.

The average load-elongation diagrams for tensile tests on the cotton fabric with and without coating after ageing in the oven, Weather-o-meter and outdoors are depicted in Figures 4, 5 and 6 respectively. The change in tensile energy at each ageing station is given in Table IV. All types of ageing produced some shrinking of the coated fabric, resulting in an increased elongation at break. For the cases in which no loss in strength occurred, this elongation increase resulted in an increased energy to rupture. In the extreme cases the loss in tensile outweighed the shrinkage effect and the energy decreased.

Comparison of the load-elongation diagrams of the 800 hour oven aged coated samples in Figure 4 illustrate the effect of increased film strength and decreased film extension. The effect is referred to as "elongation balance" and has been utilized by Hamburger and Kaswell in an unpublished technique for determining the tensile durability of coated fabrics. The effect is caused by the fact that the coating and fabric are loaded in parallel and thus each holds a load depending upon the net extension of the parallel system. Before ageing the coating has a great deal more extension than the fabric and therefore contributes very little strength at the breaking extension of the fabric. Ageing produces a rapid decrease in the extensibility of the coating and a point is reached at which the breaking extension of both fabric and coating are the same and each contributes its maximum available strength at break. It is thus possible for this balancing effect to produce a net

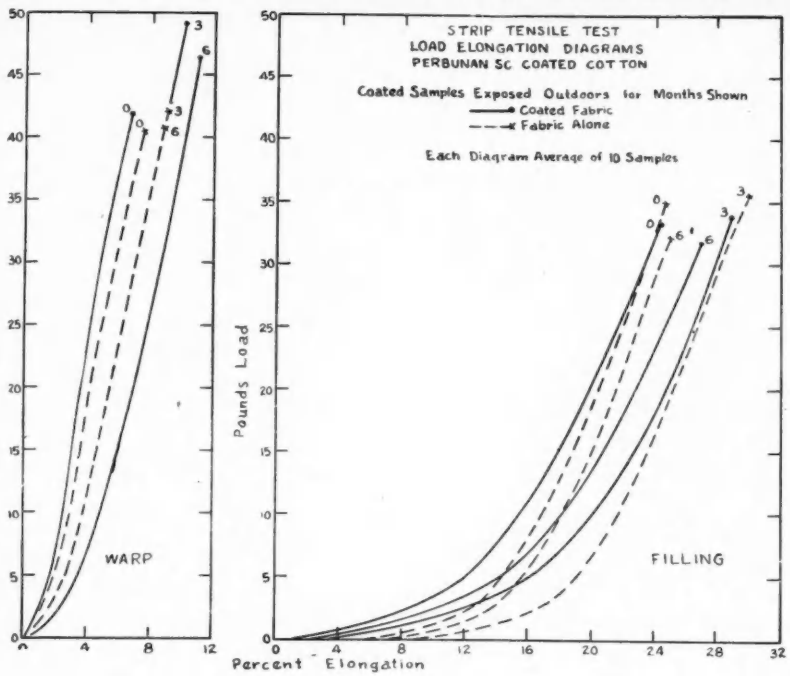


Figure 6

TABLE IV

Percent of Original Tensile Energy Remaining After Ageing
Perbunan SC Coated Cotton

Type of Ageing	WARP		FILLING	
	Coated Fabric	Fabric Alone	Coated Fabric	Fabric Alone
32 Hr. Oven	110.2	94.8	110.3	109.1
400 Hr. Oven	126.0	118.5	122.8	80.7
800 Hr. Oven	189.8	87.4	....	65.0
50 Hr. W-O-M	129.1	100.0	108.9	102.5
800 Hr. W-O-M	148.8	109.6	116.1	86.8
3 Mo. Outdoors	152.8	114.8	117.9	97.0
6 Mo. Outdoors	140.2	101.5	102.2	92.4

TABLE V

Percent of Original Tensile Energy Remaining After Ageing
GRS Coated Nylon

Type of Ageing	WARP		FILLING	
	Coated Fabric	Fabric Alone	Coated Fabric	Fabric Alone
100 Hr. Oven	88.2	92.6	88.9	103.4
800 Hr. Oven	60.1	46.2	67.4	46.2
50 Hr. W-O-M	35.4	43.6	46.5	55.4
100 Hr. W-O-M	25.6	28.1	29.3	31.0
200 Hr. W-O-M	19.2	18.9	20.5	22.3
3 Mo. Outdoors	42.5	49.4	41.5	47.7
6 Mo. Outdoors	26.9	28.0	23.1	21.6

increase in strength of the combined system even though each member were sustaining a loss from its individual maximum.

The above points are well illustrated by the large increase in strength of the warp coated cotton fabric for the 800 hours oven ageing. The breaking extension of the coating has been reduced to about 4 to 6 percent, which is quite close to that of the fabric. The strengths are thus additive, except for two samples whose coating extensibility had decreased below that of the fabric and the coating cracked before complete rupture.

The fabric extensibility in the filling direction was greater than the coating so that the latter cracked and broke long before the fabric gave way. The breaking extension of the coating alone was not uniform from sample to sample and the results were quite variable. However, the initial slope of the load-elongation curve was about the same for all samples, and the point at which each broke varied along the upper end of the curve. The samples fell roughly into two groups as indicated in the figure.

Similar tensile data for the nylon fabric are given in Figures 7, 8 and 9. Table V gives the decreased tensile energy values with ageing. The same elongation balance effect is observed in Figure 7 for the 800 hour oven ageing of the GRS coated nylon. In this case, however, the coating strength was much weaker since it was a thinner, more dispersed coating. Also, its breaking extension was much below that of the nylon. At some smaller ageing time, however, it would be expected that the breaking extensions would coincide more nearly and the strengths become additive.

The rapid loss of strength exhibited by the nylon in Weather-o-meter and outdoors ageings illustrates its sensitivity to ultra-violet light. GRS rubber checks and cracks under the influence of ultra-violet light, appearing under the microscope like the mud flats in the bottom of a dried-up lake. Although originally twice as strong as the cotton, the nylon had dropped to the same strength as the cotton after six months outdoors exposure. The disparity was even greater in the Weather-o-meter ageing since the relative ultra-violet intensity is much higher in this accelerated test than in the outdoors exposure.

The losses in tongue tear energy with ageing are listed in Table VI for the cotton and Table VII for the nylon. Typical tear diagrams for extreme stations are shown in Figures 10 and 11 for the cotton and nylon respectively.

It is quite evident from these diagrams that the drop in tear load from each maximum peak has greatly diminished and that there is an increase in the number of peaks per unit length. Obviously the stress distribution during tear has been changed by the stiffening of the coating. The effect is much more marked for nylon than for the cotton, since the former contained much more coating in between the yarns. The movement of the yarns is restricted, shorter lengths of yarns are extended, and the yarns tend to break more nearly one by one than by groups.

However, this restricting effect is not the only factor affecting tear strength, and it is very desirable to separate it from other factors in order to determine just how serious it might be.

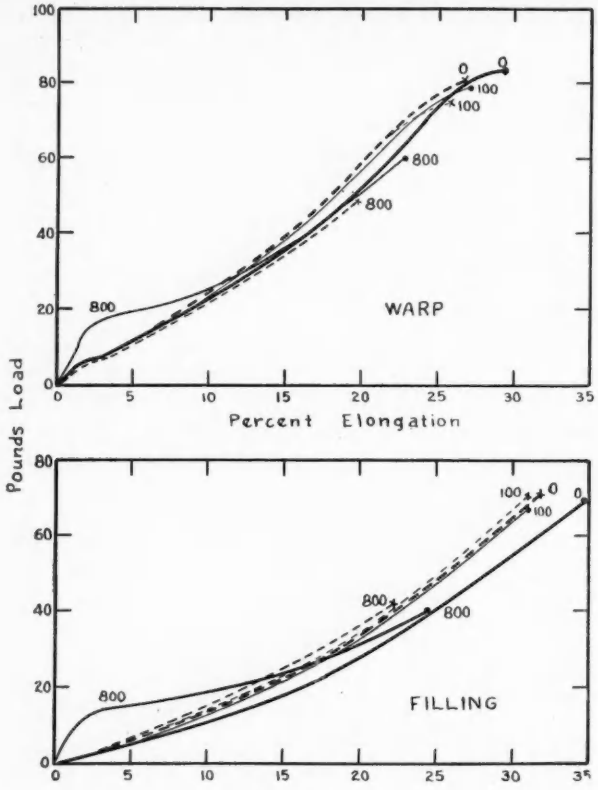


Figure 7

Strip Tensile Test
Load Elongation Diagrams
GRS Coated Nylon
Coated Samples Oven Aged at 220° for Hours Shown
——●—— Coated Fabric
— — — —X Fabric Alone
Each Diagram Average of 10 Samples

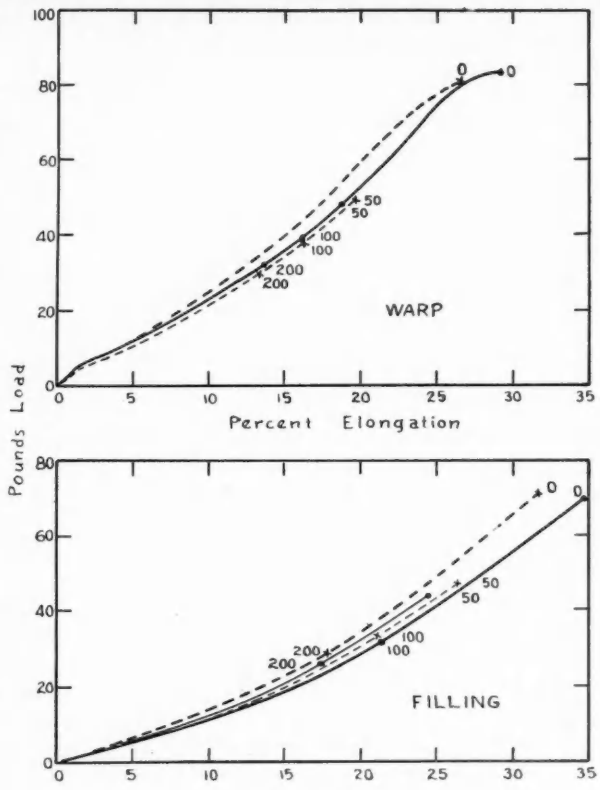


Figure 8

Strip Tensile Test
Load Elongation Diagrams
GRS Coated Nylon
Coated Samples Weather-O-Meter Aged for Hours Shown
——●—— Coated Fabric
— — — —X Fabric Alone
Each Diagram Average of 10 Samples

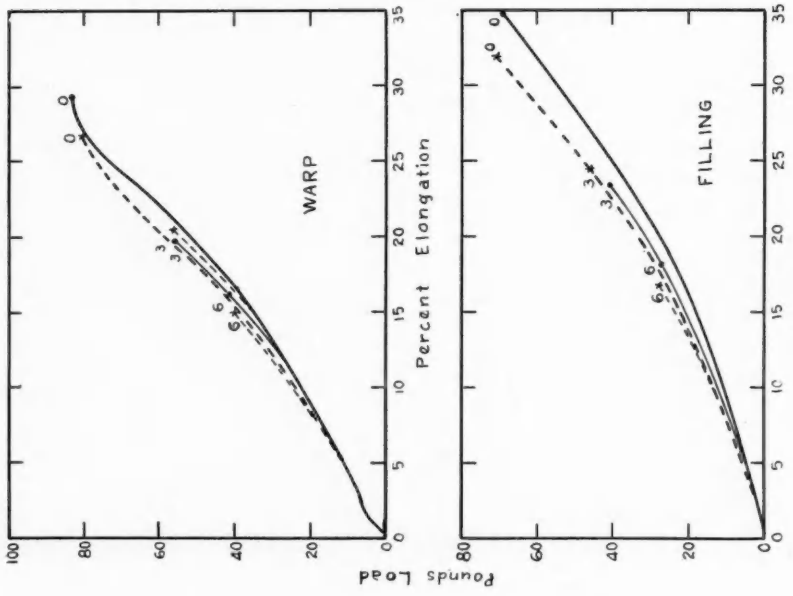


Figure 9

Strip Tensile Test
Load Elongation Diagrams
GRS Coated Nylon
Coated Samples Exposed Outdoors for Months Shown
——●—— Coated Fabric
— — — —X Fabric Alone
Each Diagram Average of 10 Samples

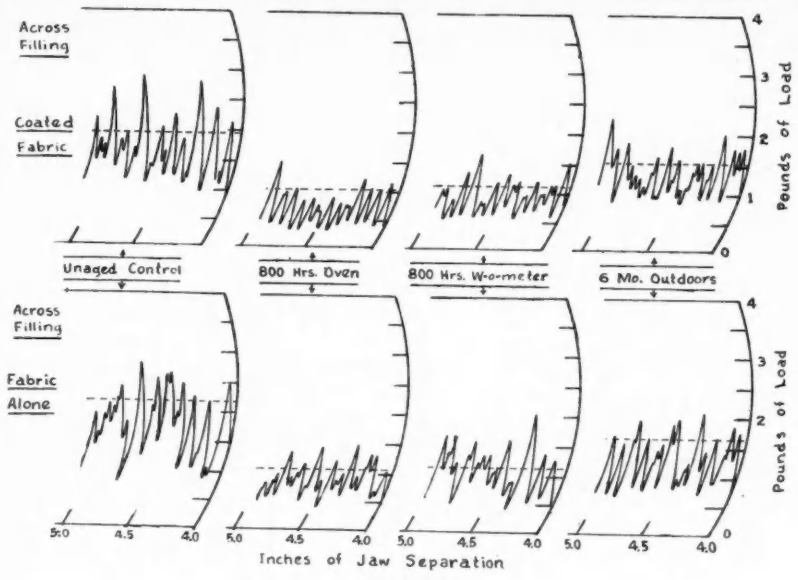


Figure 10
Tongue-Tear Test
Typical Load Elongation Diagrams
Perbunan SC Coated Cotton
Dashed Line Shows Average Maximum Peak Loads for Two Inches of Fabric Torn on Each of Five Samples.

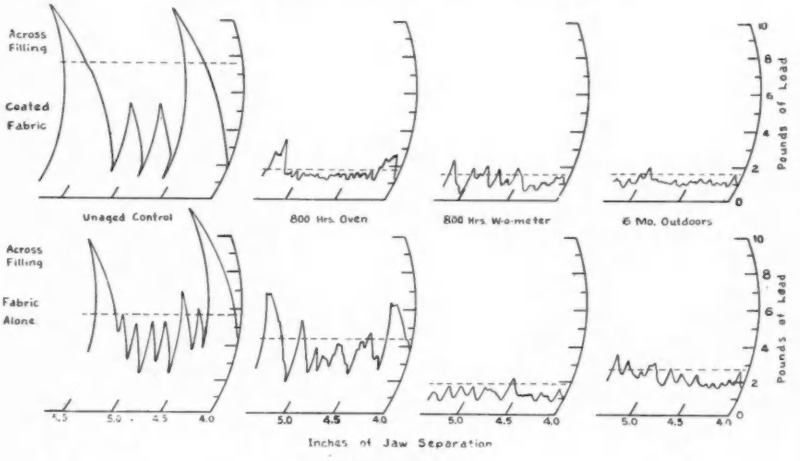


Figure 11
Tongue-Tear Test
Typical Load Elongation Diagrams
GRS Coated Nylon
Dashed Line Shows Average Maximum Peak Loads for Two Inches of Fabric Torn on Each of Five Samples.

TABLE VI

Percent of Original Tear Energy Remaining After Ageing
Perbunan SC Coated Cotton

	WARP		*FILLING*	
Type of Ageing	*Coated Fabric*	*Fabric Alone*	*Coated Fabric*	*Fabric Alone*
32 Hr. Oven	93.2	98.1	95.4	86.6
400 Hr. Oven	61.3	70.5	54.3	54.1
800 Hr. Oven	53.1	62.0	51.5	45.6
50 Hr. W-O-M-	91.2	92.8	100.0	82.0
800 Hr. W-O-M	68.5	77.9	57.7	53.6
3 Mo. Outdoors	93.6	98.7	100.9	86.9
6 Mo. Outdoors	95.2	83.7	84.0	72.7

As discussed at the outset, the fabric itself is weakened in tear strength by ageing. This loss is given by the difference between the tear energies of the original fabric alone and the aged fabric alone. The loss due to ageing plus film interference is given by the difference between the original fabric alone and the aged coated fabric. By difference, then, the effect of the aged film alone is given by the difference between aged fabric alone and aged coated fabric. These values were computed as percents of the original fabric alone as follows and are listed in Tables VIII and IX for the cotton and nylon respectively:

$$(1)\ \%\ \text{loss due to ageing only} = \frac{(E_{FO} - E_{FA}) \times 100}{E_{FO}}$$

$$(2)\ \%\ \text{loss due to coating only} = \frac{(E_{FA} - E_{CA}) \times 100}{E_{FO}}$$

Where: E = Tongue tear energy, in.-lbs./in. fabric.

Subscripts refer to values of E as follows:

F = Fabric alone
C = Coated fabric
O = Unaged control test
A = Aged test

The percents loss due to ageing only and coating only are seen to be additive to give the total loss of the aged coated fabric below the original fabric alone.

The loss due to the coating only for the cotton is seen (Table VIII) to be in most cases insignificant in comparison to the losses due to ageing only. In some cases (6 months outdoors, warp) the coating apparently gained sufficient strength and retained its flexibility so that it actually made up for the loss in ageing.

In the case of the nylon losses, (Table IX), the film interference is quite evident in the oven ageing. It is also evident in the early stages of Weather-o-meter and outdoors ageing, but diminishes as the cracks in the GRS open up and allow the ultra-violet to get at the nylon. This cracking of the GRS also probably tends to diminish the film interference since the film is no longer continuous.

Summary

Changes in tensile and tear properties of coated fabrics on ageing are brought about by two different mechanisms. The change in tensile strength was shown to depend upon "elongation balance" between the coating and the fabric. The loss

TABLE VII

Percent of Original Tear Energy Remaining After Ageing GRS Coated Nylon

Type of Ageing	WARP		FILLING	
	Coated Fabric	Fabric Alone	Coated Fabric	Fabric Alone
100 Hr. Oven	92.4	100.0	89.5	109.9
800 Hr. Oven	31.5	88.6	36.8	83.3
50 Hr. W-O-M	56.2	69.2	50.1	76.2
100 Hr. W-O-M	34.2	50.9	34.2	46.4
200 Hr. W-O-M	23.4	34.1	28.5	35.8
3 Mo. Outdoors	76.3	88.3	62.7	78.2
6 Mo. Outdoors	...	61.0	29.5	47.5

TABLE VIII

Tongue Tear Energy Losses Upon Ageing of Coated Fabrics Perbunan SC Coated Cotton

Type of Ageing	WARP		FILLING	
	Loss Due To Ageing Only, %	Loss Due To Coating Only, %	Loss Due To Ageing Only, %	Loss Due To Coating Only, %
Unaged Control	...	gain 6.0	...	16.0
32 Hr. Oven	1.9	0.0	11.0	6.4
400 Hr. Oven	29.5	5.5	42.2	8.5
800 Hr. Oven	38.0	5.7	50.5	2.3
50 Hr. W-O-M	7.2	gain 3.8	12.8	gain 1.7
800 Hr. W-O-M	22.1	5.3	44.0	5.2
3 Mo. Outdoors	1.3	0.0	8.3	2.1
6 Mo. Outdoors	16.3	gain 17.2	23.9	2.1

TABLE IX

Tongue Tear Energy Losses Upon Ageing of Coated Fabric GRS Coated Nylon

Type of Ageing	WARP		FILLING	
	Loss Due To Ageing Only, %	Loss Due To Coating Only, %	Loss Due To Ageing Only, %	Loss Due To Coating Only, %
Unaged Control	...	gain 14.4	...	7.8
100 Hr. Oven	0.0	gain 5.9	0.0	27.3
800 Hr. Oven	11.4	52.7	16.7	49.5
50 Hr. W-O-M	30.8	5.1	23.8	30.0
100 Hr. W-O-M	49.1	11.4	53.6	14.9
200 Hr. W-O-M	65.9	7.4	64.2	9.7
3 Mo. Outdoors	11.7	1.0	21.8	20.4
6 Mo. Outdoors	39.0	...	52.5	20.3

in tear energy was shown to be the sum of two separate effects: the loss due to degradation of the fabric and the loss due to film-fabric interaction. The latter was shown to be usually the less serious of the two losses, especially for a coated fabric with the film adhering only to one side, instead of amongst the interstices of the yarns.

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Gearing Toward Better Textiles

(Concluded from Page P766)

to educational laboratories. The large sum of money given is, with reference to each individual contribution, of fair size in most cases, but is nevertheless, you must admit, a miserable showing with respect to the textile industry in general, and is one of the blots on the horizon when it comes to the textile industry supporting research for its own good.

In addition to the tangible results mentioned above, there are many other phases which should be called to your attention, but for which time does not allow. You must, however, realize that your company is made more efficient, in spite of itself, by the over-all improvement of the industry in general, and the AATCC is doing an exemplary job when it comes to technical meetings and the training which younger men get through working on research committees and associating with older men who have the industry at heart.

If I am successful in getting no other message over to you tonight, I am especially pleased to have the opportunity to set you straight on something which has been a false rumor and repeated by all together too many, and that is this. These men, in spite of the feelings of a few individuals here and there, do *not* disclose at research meetings or general meetings, company secrets, but do lend their knowledge and give of their vast experiences to help the work at hand. It is well realized today that supervised and organized play for children trains them to face future problems of life in a clearer-thinking, more understanding way, and it likewise is true in the training of young men for the textile industry through the means of AATCC contact and work.

In closing, let me say that each and every one of you representing a company or an organization should be well pleased that you have working for you such an Association as the American Association of Textile Chemists and Colorists, which is ever ready to investigate any new propositions brought forth by the industry. This is done by setting up a working committee which will do the job on a practical basis, and yet a fair basis, such as was done recently on flameproofing, water resistance just mentioned, and is well under way on coordination of wash tests versus home washing, commercial laundries, and the new type washing machines. It should be emphasized that this work is being done on an impartial basis, and you can be proud that your organization in no way, shape, or manner involves itself in political aspects or in small groups or cliques which have an ulterior motive at hand.

The standardization of test methods gives you all a common language to have a proper understanding between buyer and seller, between manufacturer and user, and I leave with you the thought that each and every time for some one week or some one day that you are talking quality you note the connection between research of AATCC and your problem, and I am sure that you will feel gratified that you have had a part as a Corporate Member, or if you are not one now, you will realize responsibility to the industry and become one. There is no question but that the AATCC has been, and will continue to be, a very important cog in the wheel of gearing toward better textiles.

Cellulosic Fibers Group Meeting—

Practical Experience in Vat Acid Dyeing*

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General Dyestuff Corporation

AT THE Silver Jubilee Convention held in Boston last December, the Piedmont Section presented an Intersectional Contest paper on the subject of "An Evaluation of the Vat Acid Process." This subject, therefore, is not new to you. Nevertheless, sufficient interest has been shown throughout the trade to justify its presentation at this time, more from the practical angle.

The vat acid method of dyeing was brought to our attention in 1937. Its only field of application, based on laboratory and theoretical investigation, appeared to be in package machine dyeing. Work conducted at that time in package machines indicated that the method had some degree of merit, particularly for the dyeing of light and medium shades on spun rayon. Difficulties in level dyeing due to the intense swelling of rayon appeared to be a primary consideration in attempts to develop a method of Vat Dyestuff application which would yield better results. It was not until the return from Germany of one of the textile teams, making a survey for the Office of the Quartermaster General, that impetus was given to an investigation of the practical aspects of vat acid dyeing. In keeping with the interest, which new processes create in the finishing industry in this country, many plants undertook a series of practical trials in order to thoroughly exploit the method. The method was ingenious, and undoubtedly curiosity was partially responsible for the interest which was created.

As you are well aware, vat dyestuffs are usually applied to materials from solutions containing a reducing agent and a caustic alkali, the pH of which is in the neighborhood of 13. In pigment application, the padding bath is usually neutral, but the bath for the reduction of the dyestuffs on the material should have a pH of 13. An exception to this must be noted, namely, when an alkali such as trisodium phosphate is used, chiefly for dyeing fabrics containing protein fibers, a lower pH is used. In the pigment method as applied to yarns and in the pigment padding process as applied to piece goods, reduction and fixation of the dyestuffs occur in the fibers. The advantages of the pigment methods of application are too well known to require any detailed explanation.

In the preparation of the vat acid, which incidentally is the acid leuco compound of the vat dyestuff, two steps are necessary.

First, reduction of the vat dyestuff in the normal way with caustic soda and hydrosulfite at the temperature recommended for the vat dyestuff in use.

Second, conversion of the sodium leuco compound to the acid leuco by means, usually, of acetic acid.

From your speaker's experience, the pH of this solution is not necessarily of great importance, a range between 4.5 and 5.5 appearing to yield satisfactory results with the dyestuffs so far investigated.

Of far greater importance is the use of a dispersing agent capable of maintaining a fine state of division of the acid leuco compound. The dispersing agent must, however, be added before acidifying. Experience has shown that the addition of the dispersing agent prior to reduction is safest, yielding after acidification, acid leuco compounds of a satisfactory nature. Countless dispersing agents have been tried, but only one available commercially answers all requirements, namely, Blancol Concentrated Powder, which is the formaldehyde condensation product of naphthalene di-sulfonic acid. A point to be remembered in the formation of the acid leuco compound is the necessity for rapid conversion. The dilute acetic acid, which must be the same temperature as the reducing liquor, should be added very quickly; in fact, experience has shown that a reversal of the procedure, namely, addition of the reduction liquor to the acetic acid, yields more satisfactory solutions from the standpoint of dispersion. The question of the stability of the vat acid is one which is quite likely to occur to you. It has been found that vat acid solutions kept for 24 hours are still satisfactory to use, provided the precautions previously explained are taken. This factor of time is likely to vary with the acid leuco compound of different vat dyestuffs, but for all practical purposes, the stability is satisfactory. As far as dyestuff yield is concerned, there is no material difference between dyestuffs applied by the vat acid method and other methods now in use.

The experience which the pigment padding process of vat dyestuff application has provided, indicates conclusively the great importance of particle size. The application of vat dyestuffs to cotton piece goods by the pigment padding process was conducted for the first time in this country in 1912, by Dr. Karl Pfister. At that time, evidently, consideration was given to the importance of particle size of vat dyestuffs because the grinding of the vat pigments prior to padding was commonly practiced. It was found that by means of milling, improved penetration, as well as improvement in the quality of the dyeings from the standpoint of coverage, were obtained.

As a result of these observations made many years ago, it can be readily understood that the advantages derived from the use of this method are directly traceable to the fineness of division of the dyestuff. This is clearly illustrated by comparing X-ray diffractions made of vat dyestuffs in their pigment form as they appear on the market and of the acid leuco compounds of the same dyestuffs. From the many photographs which have been made, a rather definite conclusion is drawn that certain vat dyestuffs in the form of their leuco acids approach molecular proportions as far as particle size measurements are concerned. These particular ones are not measurable. On the other hand, those which are measurable are found to be from one-fifth to one-tenth in size compared to the original pigment.

It has been reported by Dr. Dahlen that differences in dyeing temperatures and affinity of the sodium leuco compound

* Presented at Cellulosic Fibers Group Meeting, George E. Osha, Presiding, National Convention, Chicago, October 24, 1947.

are of secondary importance. The value of the latitude which this observation permits has been clearly demonstrated by the results of practical experience.

Package Dyeing

In the application of the vat acid process to yarns in package machines, the initial processes do not differ to a large extent from those employed in the reduced and in the pigment methods. The process provides no short cuts, in fact, an additional operation of acidifying is required. A typical example of the dyeing method used will suffice to cover this field of application. The yarn is first boiled out in the conventional manner, with soda ash and a synthetic detergent and a fresh bath made up at 100° F. containing a wetting agent such as Nekal BX or Igepon T Gel. The vat acid solution is then added to the expansion tank over a period of 30 minutes, additions being made in at least 3 parts, changing the direction of the flow at 2½ minute intervals. If provision can be made for installation of an auxiliary tank, provided with a spigot, gradual addition of vat acid solution can be accomplished over a period of 30 minutes. This auxiliary tank is almost a necessity because the additions of caustic soda and hydrosulfite must be made gradually also over a period of 30 minutes. It furthermore is important to add over the first 10 or 15 minutes, about 30% of the total caustic soda and hydrosulfite. From this point on the feeding rate can be increased rapidly. The reason for the gradual addition of alkali and hydrosulfite is to prevent immediate conversion of all the acid leuco to the sodium leuco compound. If this precaution of gradual addition of caustic soda and hydrosulfite is not taken, it obviously follows that the process would be practically no different from the ordinary reduced method. Unlike the sodium leuco compounds, the acid leuco compounds have practically no affinity.

After the addition of all the dyestuff, the temperature is gradually raised first to 130° F. and then to 160° F. and dyeing continued at that temperature for 20 minutes. This insures penetration and assists in elimination of cross-overs. With dyestuffs of the Vat Blue BCS type, the temperature should not exceed 140° F. The final operations conducted are the same as those in the pigment or in the reduced method, namely, rinsing, oxidizing, soaping, etc.

The vat acid is prepared as follows:

Smith Drum Package Machine
125 lbs. Cotton Yarn
6 lbs. 8 ozs. (5.25%) Vat Navy Blue BRP Pst.
1 lb. 8 ozs. (1.20%) Vat Blue BCS Dbl. Pst.
1 lb. 2 ozs. (0.81%) Vat Violet FFBNA Pst.
3 lbs. Blancol Conc. Pdr.

The dyestuff is made up to 20 gallons with water at 130° F., the Blancol added and reduction conducted for 10 minutes with:

3 lbs. Caustic Soda Flakes
3 lbs. Hydrosulfite

The reduced solution is poured quickly into:

10 gallons of water at 130° F. containing
9 lbs. Acetic Acid 56%

To the vat acid solution 4 ozs. Nekal BX is added.

Obviously this solution must be definitely on the acid side. The testing of the pH, while desirable, is not necessary.

It has been found that the addition of 3 lbs. of acetic acid 56% for each pound of caustic soda flakes yields a satisfactory acid leuco of vat dyestuffs suitable for use by this process.

For conversion to the sodium leuco compound, the following solution is added to the expansion tank, taking care to make additions slowly at the start, as previously pointed out.

20 gallons water
8 lbs. Caustic Soda Flakes
8 lbs. Hydrosulfite

It is quite evident that the process which has been outlined is not the essence of simplicity compared to conventional methods now in use, and for the vast majority of shades required for package dyeing the extra operations involved do not justify the general use of the method. The claim only can be made that for dyeing pale shades on singles cotton yarn and on spun rayon, more even results throughout the package are obtained. This is an advantage of considerable value to many trades.

It is important to draw to your attention at this time, since reference has been made to the advantages derived from the use of this method for the dyeing of light shades, that there is a limit to the concentration in which the vat acid can be made. This limit varies considerably with different vat dyestuffs. For example, it is impossible with our present knowledge of this subject to prepare a vat acid of Vat Blue BCS type in a concentration greater than 2½ ozs. dyestuff of double paste strength per gallon of liquor, because a satisfactory dispersion cannot be obtained. On the other hand, dyestuffs of the Vat Brown R type form stable and satisfactory Acid Leuco compounds in a concentration of 1 lb. single paste per gallon of water.

Piece Dyeing

In the field of piece goods dyeing, a considerable amount of work has been done by the pad-jig method and by the continuous method. In the continuous method, conversion to the sodium leuco compound has been effected in the Williams machine and also by the pad-steam process.

A typical example of the pad-jig method will suffice to explain the steps required for dyeing practically any shade. For the dyeing of a shade of brown such as this one the padding bath was made up as follows:

130 gallons
40 lbs. Vat Brown G Double Paste
12 lbs. Vat Yellow GC Paste
2 lbs. Vat Brilliant Green B Dbl. Paste
12 lbs. Blancol Conc. Powder

Reduction was carried out in 110 gallons for 5 minutes at 130° F. with:

10 lbs. Caustic Soda Flakes
10 lbs. Hydrosulfite

The acid leuco was formed by the addition of:

20 gallons water containing
30 lbs. Acetic Acid 56% at 130° F.

The addition of 1¼ lbs. Nekal BX followed.

Straining of the prepared padding bath is desirable but difficult of accomplishment when a large volume of padding liquor is involved. The matter of straining is most easily conducted by covering with a cloth the spray pipe in the pad box. A padding liquor of the concentration given, tends to block up the pores of the straining cloth. In fact, it appears to be unnecessary to strain highly concentrated pad liquors, but this precaution is always a safe one to take with pad liquors containing under 4 ozs. of dyestuff per gallon.

One thousand yards of mercerized 80 square material was padded in a 2 bowl pad at a speed of 80 yards per minute, and the cloth was immediately batched. The padded cloth was then transferred to the jig where it was given three ends through a bath containing the usual quantities of caustic soda and hydrosulfite at the prescribed reduction temperature for the dyestuffs used. In this particular run, the jig bath was made up as follows:

75 gallons of water
10 pounds Caustic Soda Flakes
10 pounds Hydrosulfite
Temperature 140° F.

You, of course, realize that development of a shade of this depth dyed by the pigment method cannot be completed in three ends. It would not be surprising to

find that complete and even development of such a shade could be obtained in two ends by this method. For dyeing a light shade of blue, such as this one, padded with a solution containing ½ oz. Vat Brilliant Blue RCLN Double Paste per gallon, two ends in caustic soda and hydrosulfite were found to be sufficient. This saving in time is attributed to the almost instantaneous conversion of the acid leuco to the sodium compound, again bringing to mind the remarks previously made on the subject of particle size. As you know, the first end of pigment padded piece goods shows only partial conversion to the sodium leuco compound in passage through the reducing solution in the jig. Vat acid padded material shows the characteristic color of the sodium leuco compound immediately. Compared to the development of pigment padded material, this rapid conversion tends to reduce the amount of stripping with a number of vat dyestuffs. Obviously a reduction in the number of ends reflects a saving in chemicals as well as in time.

Many different shades have been run successfully by the method which was just outlined on a variety of constructions such as:

Mercerized 80 square cotton piece goods
Combed 3.35 mercerized twill
Army suiting 8.2 ounces
64 x 104 mercerized sateen weight 4.37
Combed mercerized broad cloth 2 x 2, 144 x 76

Before proceeding with an explanation of other application methods, it seems advisable to point out what advantages are derived from the use of vat acid process applied by the pad-jig method.

Better coverage of fabrics likely to show unevenness by the pigment method, due to faulty prepare. Visible evidence of this trouble is at once observed as the cloth leaves the nip and is batched. Frequently, the subsequent reduction operation in the jig covers up these defects.

Elimination of dye specks, which vat dyestuffs occasionally show, particularly in light shades by the pigment method.

Freedom from unevenness caused by migration of the dyestuff in batched rolls, occasionally encountered in the pigment method.

Continuous Method

Considering the fact that the vat acid process is relatively new to us in this country, the yardage of cotton fabrics which have been dyed according to continuous methods is considerable. As has already been pointed out, the conversion of the acid leuco to the sodium leuco is instantaneous. In fact, the time of conversion appears to be immeasurable. As a consequence, the necessity for large booster boxes is non-existent. Of course, the large booster method has been discontinued to a considerable extent in this country in favor of the Williams machine method and of the pad-steam process.

Our experience to date with the Williams machine method of developing vat acid padded piece goods, indicates that reduction temperatures lower than those recommended for developing pigment padded material yield satisfactory results. Furthermore, smaller quantities of caustic soda and, naturally, hydrosulfite are required. In fact, practical runs made with vat dyestuffs of the IN or hot dyeing class, as well as with vat dyestuffs of the IW or warm dyeing class, show that the same yield is obtained at 160° F. as at 200° F.

Practical trials made on mercerized broad cloth padded with a dyestuff concentration of 4 ozs. per gallon showed that equally as heavy shades were obtained by wet developing in the Williams unit at 160° F. as at 200° F. The uniformity of each was also equal.

The vat acid process is well adapted for use according to the pad-steam process. Work done in this manner up to the present time on fabrics which were not dried after vat acid padding has been very satisfactory. The construction of the fabric may, nevertheless, have some influence on the quality of the dyeing of fabrics which have not been dried.

We find that smoother results are obtained, particularly in constructions containing nubs, compared to the pigment padding method. I have with me dyeings of Khaki No. 1 on 6 oz. mercerized Army twill, padded with the vat pigment in one instance, and padded with the vat acid in the other, both dried in the hot flue. The same chemical pad and time of ageing was used for developing by the pad-steam process. Even these small swatches show the difference in coverage to which I have already referred. This particular construction made with carded yarns showed numerous nubs. The nubs in the material dyed by the pigment method were much more pronounced than in the material dyed by the vat acid method. Furthermore, it was noticed that removal of the larger nubs from the fabric dyed by the pigment method showed complete absence of dyestuff at the base of the nub. The nubs in the fabrics dyed by the vat acid process were completely penetrated, emphasizing once more the value of fine particle size and tending to prove the theoretical explanation of the reason for improved penetration.

The value and the importance of drying vat acid padded material prior to developing is a subject which deserves some comment. In this country, no direct comparisons have been made as far as is known. Undoubtedly, the same advantages of drying pigment padded piece goods hold for vat acid padded material. It is difficult to predict what the effect of uneven drying, i.e., back to face of vat acid padded material would be, possibly less tendency toward facing.

Other Fibers

The vat acid process has been proved of value in the dyeing of various types of spun rayon fabrics. As you know, considerable yardage of spun rayon fabrics are still being dyed with vat dyestuffs by the pigment pad-jig method. Obviously, any method which tends to reduce the number of ends required in jig operation is of value for spun rayon fabrics, particularly from the standpoint of shrinkage. Excellent results have been obtained on blends of 80-20 spun rayon-wool by the pad-jig method, as well as by the continuous method. Fabrics of spun rayon and wool, in which the wool content is 40% also yield satisfactory results by the vat acid process developed in the Williams unit as well as in the pad-jig method. For fabrics containing animal fibers, a reduction in the number of ends required to effect complete development is a distinct advantage inasmuch as there is less impairment of the animal fiber.

It must be admitted, however, that dyestuffs of the Vat Blue BCS type do not yield a perfect union, but this is also true when the pigment method of application is used. In the development of vat acid padded fabrics containing wool, it is possible to replace the caustic soda with a milder alkali such as trisodium phosphate. Since development in the Williams unit can be conducted at 160° F. when using the vat acid process, a much more satisfactory hand of such fabrics is obtained.

We have also found that the continuous development of vat acid padded constructions composed of cotton, spun rayon, and animal fibers, yield a satisfactory union between the rayon and the cotton.

The vat acid process has not found any particular use for the dyeing of all acetate fabrics. We can of course make use of this method as we do with vat dyestuffs applied as pigments. After padding, development can be conducted in the jig in the presence of an alkali and hydrosulfite, whereby, saponification takes place. The amount of practical work done in this field is so negligible that advantages if they do exist, have not yet been brought to light.

Excellent results have been obtained on constructions of 80-20 spun rayon-spun acetate, and in light shades of blends of

(Concluded on Page P784)

General Research Meeting

National Convention, Chicago, October 24, 1947

THE General Research Meeting, held in the Gold Room of The Congress Hotel, Chicago, Illinois, convened at eighteen o'clock, Dr. Louis A. Olney, presiding.

Chairman Olney: The meeting will come to order.

At the Council meeting yesterday morning, Mr. Bonnar, who has been Chairman of our Executive Committee on Research, was appointed Acting Chairman of the Research Committee, and he really should preside at this meeting.

During the early years of the Association I remember that he came to one of our Research Committee meetings in Boston, acting as proxy for some other member, Arthur Hirst. He was just a young boy at that time, but he became very much interested in the research work of the Association and it was not long before he was a member on his own.

Since that time he has been chairman of a number of our subcommittees and has done excellent work for the Association. As you know, during the last two years, he has been Chairman of the Executive Committee on Research.

The Program tonight has been arranged very largely under the direction of Dr. Stiegler. It is very fitting and officially proper that I should turn over to Mr. Bonnar the direction of this meeting, and perhaps hand to him the invisible gavel. I have presided at 150 Research Committee meetings without any such instrument, but I know there have been times when, if I had a good heavy one, things might have gone along a little bit better.

. . . J. Robert Bonnar assumed the Chair . . .

Chairman Bonnar: Thank you.

Dr. Olney: I think you are perfectly competent to carry on where I leave off. I wish to say, also, that the address that Mr. Bonnar made last night shows how closely he has been in touch with the work of our Research Committee. I will admit I have done very little for several months and I have left the heavy work to Mr. Bonnar and Dr. Stiegler. So, go to it with our blessing.

Chairman Bonnar: Thank you, Professor Olney.

For once I don't know what to say—that's the truth.

You know, to follow through with the vigor and the ambition, and particularly the vision that Dr. Olney has done for years—I just hope that I can do a portion of the job that he has done—and I mean that from the bottom of my heart, because I know what he has done. I have been with him a lot. I have seen how he works. I have seen the results; and it has meant more to this Association than any of you realize.

Now I know we promised to get you out of here at nine-fifteen, and we are going to do it. I only wish I had the gavel that was mentioned a few minutes ago to go after some of these fellows who do some of the kicking around here that this Association doesn't do this or that or the other thing. It isn't right to tell you fellows because you are here, but I would like to get all the rest of them in here, and have the rest of you outside, and then tell them what I think about them. It is not very fitting to have it happen this way.

The interested ones, however, do come, and we have some interesting reports tonight; and Dr. Stiegler will give you the highlights, outside of those Committee reports, which we will receive as individual reports.

Dr. Harold W. Stiegler: The research program of the AATCC, as many of you know consists of two broad divisions; One: test methods, standards, and instruments. This is quite a wide field and an extremely important one. Testing must continue to be a major effort because of the increasing demand for improved procedures and end-use test.

Two: Investigations in the wet processing of textiles. Few people seem to realize that we do have a definite obligation in that field. Investigations in the preparation of dyeing and finishing of textiles are a necessary function for which our Association is ideally suited.

Our plans have been to greatly increase this function, but the pressure of test development has subjugated this work for the moment.

Mr. Bonnar, Chairman of the Executive Committee on Research, has actively pushed the Sectional Advisory Research Committee program, and the research questionnaires—not only actively but relentlessly. These questionnaires are coming in now, as he stated last night, and I think if he had had more time he would have told us more of the things that are in his mind in connection with the suggestions and ideas that have come in on these research questionnaires.

These questionnaires were sent to all the members of the Association. They gave an opportunity for the men to get their ideas on paper and to keep their Association informed of their thoughts. The value of that, I believe, will increase as time goes on and these questionnaires are correlated.

The AATCC research may be divided into two parts: I *Projects under investigation in the AATCC laboratories in Lowell.* There have been six active projects in this category.

One: The development of the fastest possible OD-7 shade on cotton, to destructive agencies. This is a Quartermaster project ($25,000). That project is now finished.

Two: A project for the Chemical Corps of the Army (2 years $40,000).

Three: Wash fastness; the role of abrasion and loss of color in laundering, and the development of suitable test methods. This project is showing up some very interesting facts about laundering and the loss of color during the laundering procedures, especially in connection with abrasion.

Four: Dimensional changes in fabrics.

Five: Improvement of test methods for fastness to perspiration.

Six: Water resistance of fabrics—a comparison of commonly used methods and instruments. In connection with this, the Research Committee on Water Resistance adopted, as a tentative standard, the duPont rain tester, about which most of you have heard. Six of these instruments are in the process of manufacture now, and nearly complete. Undoubtedly more of these will be made.

Of these six projects that have been going on in our laboratories, at the Lowell Textile Institute, two have been completed. One is the Quartermaster Project

on OD-7 shade, and the other is the comparison of the various water-resistance tests. The reports on these are now being written.

II. *A second phase of AATCC research is the projects assigned to other laboratories.*

One, an investigation to determine the interchangeability of salt and Glauber's salt in dyeing, is conducted in two phases. One of these phases is the physical chemistry and theory involved. This is being done at Lehigh University.

Two: Application research on laboratory and mill scale by a group of wool chemists in Lawrence, Massachusetts.

Those two activities are being coordinated. The results are most interesting with respect to whether or not these two salts are interchangeable, particularly in wool dyeing. As most of you know, this subject is good for a fight anywhere dyers are together. Indications are that the salts might be interchangeable. We haven't final proof, but it is pointing up in that general direction.

Plans are under way to place other projects where they may be most effectively prosecuted; for instance, the placing of a project in the South. A number of ideas have come in and continue to come on the questionnaires, which undoubtedly will lead to the placing of projects in other laboratories and sections.

The detergency comparator, which most of you have seen in the Research Committee Exhibits, is under final test for use in the wool field before being released for manufacture. The wool people feel quite well satisfied now that the detergency machine will indicate what a detergent will do in the mill. They do want to make a few more tests, particularly on the improvements that have been made on the machine in recent weeks.

Various research committees are carrying forward their own vital investigations in their special fields which we can't report in full detail tonight but you will hear about some of the work that has been prosecuted in the last year.

Attention is being given to the research developments and needs of allied industries, such as paper, plastic, and so forth, as the lines of demarcation between these fields and the textile field are crumbling and apparently crumbling fast.

Our facilities at Lowell are being increased both as to space and equipment.

Mr. Bonnar: I will ask Mr. Seibert to go on with his wash fastness report.

We have asked that these reports be limited to five minutes because, as I said before, we promised to get you out at nine-fifteen, and we are going to do it.

Fastness to Washing

Charles A. Seibert: This committee was formed in 1922. In 1925 it sponsored its first wash fastness test methods. In 1929 these tests were revised to utilize the Launderometer, which had been built, after careful tests had demonstrated, that tests made in it, produced results comparable with careful practical commercial laundering. Comparisons had illustrated that one test in the Launderometer had a destructive effect on the color of cotton textiles similar to the effect of five or more careful practical commercial launderings. In 1927 the National Association of Finishers of Textile Fabrics sponsored a program to label dyed and printed cotton textiles to identify them as having been tested and to certify that their colorfastness to washing and to light, conformed with an established minimum requirement. The processors of these labeled textiles accumulated information on the reliability of these tests, to predict practical performance. That information resulted in another revision of the tests in 1939. These new tests were designed with consideration for the fastness to washing obtainable with different classes of dyes. Grading of wash fastness by these tests served to indicate to the experienced practical colorist, dyer, and printer, the probable fastness of the fabric to other color destructive conditions to which it would be exposed in practical use. Shortly after these tests were adopted, fabrics processed by the mechanical fixation of the color with an adhesive binder, were introduced. As with many new developments, practical use disclosed some unexpected and unsatisfactory qualities.

Some of this material, improperly processed withstood the #3 wash test satisfactorily, but failed in commercial and home laundering. This appeared a serious defect in the test method, and to learn the facts, the study was undertaken, on which the following is a brief report.

This historical background introduction is included principally as evidence that the present test methods were developed after careful consideration for established facts, and that if they are no longer reliably useful that condition may be due in some degree to changes in commercial and home laundry practices introduced since the tests methods were established.

Information on details pertinent to a clear understanding of this report are published in the American Dyestuff Reporter, issue of April 21, 1947; Vol. 36, #8, starting on page 196.

The committee concerned with the present study consists of four separate divisions; one for cotton and linen, another for synthetic fibers, another for hosiery and a fourth for woolens. The latter has not started to function principally because the required fabrics have not been available.

The cotton division, which started its work in August 1944, required a minimum quantity of 100 yards of each of the 42 separate samples it secured for its study. Each division planned its work to learn the average effect of repeated commercial and home laundry washings to develop the information required to design test methods that will produce results comparable with these averages.

The following comments are on the work of the cotton division which is most advanced in its study. 11 commercial laundries and 8 members of the division subjected the 42 samples to 30 or more repeated washings; the commercial laundries in laundry wheels, together with their regular work, while the committee members used several different styles or types, of home laundry washers and did the washings under different conditions, such as drying in bright sunlight and drying protected from strong light, and with synthetic detergents, and with soap. The destructive effect on the colors varies very widely in the work of the different commercial laundries and it also varies considerably in different home laundry washers. As illustrations: laundry F effected a very serious color destruction on all except 2 of the 42 samples in 5 washings, whereas laundries Q and R required 17 washings to effect similar color destruction. However, this is not an accurate comparison, because some of the least fast colors were seriously affected by all of the laundries in less than 10 washings, and these fugitive samples lower the averages of the laundries that caused the least color destruction, much more than the averages of the laundries that did more color damage.

Therefore, in a comparison of individual samples we have the following figures, 5 for one laundry against 25 for another, and 5 for one laundry against 30 for another, to effect similar color damage.

We have calculated the average number of washings required to effect serious color damage on each individual sample, and then the number of the samples washed by each laundry that conforms with that average. A few of the figures are: laundry D-12, E-13, GH-20, H-13, I-4, Q-6 and R-7. When presented in this form, it is difficult to quickly comprehend the significance of these figures.

Therefore, we may present them to better advantage if we assume the samples represent finished articles. By this method the figures illustrate that their average usefulness is limited to 8 washings by one laundry and to 18 washings by another

laundry.

When we select individual samples for the comparison, we find their usefulness is limited to 5 washings by some laundries and to between 20 and 30 washings by other laundries.

Regardless of the fact that a few of the samples were seriously soiled in the commercial laundry washings, we may assume that all of the washings resulted in adequate cleansing, because the samples were washed together with soiled clothing sent to the laundries to be washed and returned in usable condition.

Soiled fabrics are washed to serve health and sanitary requirements and to restore a clean and attractive appearance. If this purpose can be accomplished by a washing procedure, to have the useful life of the fabrics withstand 20 washings, is it logical or necessary to establish test methods equivalent in severity to the wash treatment that limits the useful life of the fabric to 5 washings? In commercial and home laundry washing, it is logical to assume that treatments that cause serious color damage may also cause serious physical damage. In the washings by the commercial laundries, pieces of a size required for tensile strength tests were preserved after 1-5-10-15-20-25 and 30 washings. Laundry D effected serious color damage on all of the samples in an average of 8 washings and after 30 washings the physical strengths of the samples had been reduced 63% on the average, whereas laundries Q and R required an average of 17 washings to cause serious color damage and after 30 washings, the samples they washed had only lost 13 and 14% of their original physical strength. The washings made by laundry GH are closest to the average for color damage of all the laundries.

Laundry GH used a home laundry washer of the agitator type. This is *not* the automatic type, known to us as Bendix, Launderomat and Laundera'l. In the work of laundry GH, 20 of the 42 samples conformed with the averages for all the laundries. The average number of washings required by laundry GH to effect serious color damage on all 42 samples is 11 washings. After 30 washings the average loss in physical strength is 19%.

Serious color damage and physical damage does not maintain a uniform relation in all of the work by the commercial laundries.

As an illustration: laundry D effected serious color damage in 8 washings and 63% physical damage in 30 washings, whereas laundry E effected serious color damage in 9 washings, one more than laundry D, yet only effected 22% physical damage in 30 washings.

Naturally, we are trying to find logical explanations for these wide variations. They are not apparent in the information furnished by the laundries regarding the washing methods. We suspect some of the causes. As an illustration: one laundry effected serious color damage in 5 washings, when the weight of the wash liquor was between 3½ and 4½ times the weight of the wash. When the liquor volume was increased to between 9 and 10 times the weight of the wash it required approximately 8 washings to effect as much color damage as 5 in the smaller liquor volume. However, low liquor volume alone is not the only reason for rapid color damage, because in the automatic type of washer, with a full load, the liquor volume is about 9 times the weight of the wash; yet under this condition color damage is very, very low.

Naturally, before we can proceed to formulate wash test methods to predict reliably, practical performance, we must establish accurate and reliable information on the conditions that cause serious color damage and then learn if methods for adequate cleansing of soiled clothing cannot be developed to avoid serious color and physical damage. The commercial laundrymen are just as interested as we are to do their work under the best possible conditions, and are providing us with all the aid they can through the Laundry-owners Associations. We have started the work required to develop the necessary information by investigating every condition that influences color and physical damage in washing. This work is being done at the Lowell Textile Institute at Lowell, Massachusetts, the headquarters of the AATCC research activities. This work is under the general direction of Dr. Harold W. Stiegler, director of research for the AATCC and under the immediate supervision of Harlan E. Glidden, a research associate, with such assistance as can be provided by the committee.

These comments have been limited to the work of the cotton division principally, because it is most advanced in its work and because of time limitation. However, the hosiery division completed its originally planned work in 1945 and the development of test methods is held in abeyance because it is anticipated that some minor changes may be required in the Launderometer and these will probably make necessary changes in any test methods that could be developed for hosiery at this time and make them obsolete before they are well established.

The work of the synthetic fibers divisions originally planned, is also completed. However, the results have not yet been evaluated.

It is expected that this will be done in the near future and this should make it possible to distribute and perhaps publish a report on this work in the early part of the coming year.

Before concluding I should like to introduce Mr. Glidden, our new Research Associate at Lowell, whom we are relying on, to a large extent, to develop information which will teach all of us how to do adequate laundering with the least amount of color and physical damage.

Chairman Bonnar: Need I tell you, after a report like that, that it was with great tenacity that Mr. Seibert and his Committee have gone after this work, and the sincerity with which they have worked?

James Redmond is here to report as Chairman of the Committee on Fire Resistance of Fabrics.

Fire Resistance of Fabrics

James Redmond: You are probably fortunate that I am limited to five minutes this evening, because since our meeting at the last convention, our Committee on Fire Resistance has developed a good deal of interesting information I would like to discuss in detail. However, I am going to try to give you the very briefest summary, and you may read the complete information when it is published in the Dyestuff Reporter.

At our meeting last year (and incidentally we have had two Committee meetings since the Boston convention) we set, as the major objective for the Committee, the determination of whether the vertical test method, which we recommend for testing fire resistant fabrics, is suitable for the following classes of material:

1. Fire resistant clothing fabrics.
2. Fire resistant drapery and decorative fabrics.
3. Fire resistant coated fabrics.
4. Fire resistant unsupported plastic films.
5. Fire resistant canvas and utility fabrics.

The first summary is on the clothing fabrics—

The majority of the Committee reports favorably on the vertical test as a basis for defining fire resistance in clothing materials. However, those members most familiar with the work conducted under Quartermaster Corps Project No. 27, at Columbia University, feel that the inclined plane test developed by that group has definite advantages as a precise technique, and adoption of the inclined position has been suggested.

Briefly, the workers at Columbia concluded that a horizontal sample position tends to exaggerate after-flaming, while a vertical position is most conducive to after-glow—but the position inclined at an angle of 45 degrees exaggerates neither

characteristic and is therefore preferable when equal emphasis on these characteristics is desired.

Measurement of charred area in this inclined test has proven difficult, but another method of char evaluation may be feasible. After study of the Columbia work, other members of the Committee may wish to revise their opinions on the desirability of the vertical test.

On the other hand, it may be concluded that the degree of precision required in research work is desirable but not essential in a routine commercial test, and that there is greater advantage in the already wide use of and general familiarity with the vertical test.

A consideration of primary significance will be whether results among various laboratories agree more closely with one test than with the other. In other words, we have more work to do on clothing fabrics.

Report on the fire resistance of treated drapery fabrics and decorative fabrics—

The problem of writing fire resistance specifications for drapery and decorative fabrics seems to be in this state:

One: Nothing has been done as to definition of types of fabrics.

Two: The differences of procedure and objective in present laundering and present dry cleaning operations need to be brought in alignment through tests and conferences.

Three: For a fabric that is to be classified as flame-resistant, the vertical test with some modification as to glow and char resistance can be recommended. So, apparently, the vertical test is looked upon favorably by the subcommittee which studied that class of fabric.

Report on fire-resistant coated fabrics—

The comment on the fire-resistant coated fabrics was that we should have a test method designed to impinge the flame on the coating rather than test the coating and the fabric at the same time. In other words, if we are using a fire resistant coating on a fabric, we should try to test the coating rather than the entire fabric.

On the other hand, I know that the vertical test is being used by most fire authorities today on that type of material. We will have to investigate further.

Report on fire resistant unsupported films—

The samples chosen for the test represented final film thicknesses of from .002 inch to .04 inch of clear stock, and .004 inch of a white stock and a black stock. The samples represented commercially-acceptable products, such as those used in inflated objects and other consumer items.

During testing it was difficult to have good control because of the rapid combustion. Complete test results will appear in our final report, but briefly, all samples below .02 inch burned completely, most of them in less than the flame-application time, which is 12 seconds.

The work of one laboratory indicated that complete combustion occurred even on the .02 film. Pigmentation of the .004 film did not affect the rate of burning.

It appears that the present vertical test is too severe to evaluate the thinner films, which incidentally represent the large majority of applications. The Committee did not at this time make any suggestions for modification of the test, and no other testing procedures were recommended.

Canvas goods—

On the canvas goods we have had recommendations regarding cabinet changes; a definite sampling plan; conditioning period; control of the air flow during charring; and it has been recommended that we allow longer char lengths for the lighter fabrics. Right now we allow a char length of 3½ inches.

We have found that the moisture content of a canvas fabric with a mediocre fire resistant finish can determine whether it will or will not pass our test and we have tentatively established a relationship between the amount of moisture in the fabric, the length of time that it will continue to flame after we have removed the source of ignition and char length.

That is about all that I have to report at this time, but before leaving the platform, I wish to show you something that I consider very interesting. It is a fabric that is in commercial production. It wasn't in commercial production at the time of our last convention, but it shows one of the steps that are being taken today to meet this fire resistance problem.

This is a drapery fabric (indicating), woven with glass yarns in the warp and fire resistant, treated cotton yarns in the fill and I think it is quite a beautiful fabric. It has nice draping properties and has a nice hand. I thought you might be interested in seeing it. Incidentally, this passes our vertical test for fire resistance.

Chairman Bonnar: Frederic Prisley is here, I believe. Would you report on the Detergent Committee's progress?

Detergency

Frederic Prisley: This report covers the activities of the three sections of the Committee, the Wool Section, the Cotton section and the section on Standard Soil. Mr. Holland, Chairman of the Cotton section, has no report as such, but the paper of the Piedmont Section to be given by Mr. Holland during the contest tomorrow morning, will demonstrate the activities of his committee to date.

Mr. Nutting, chairman of the Wool Section has done a great deal of work on the Detergency Comparator, and is convinced that they are very nearly ready to report that the Comparator is capable of doing the work for which it is designed, namely, to predict the performance of textile detergents in practice.

The improvements and changes in the machine and technique can be summed up as follows.

The knitted tubing which was chosen as the material to be scoured during the development work, has been made slightly heavier and more compact, resulting in a fabric which more closely resembles a woven worsted fabric.

The pot eye rack and pot eye in the original machine was found to be inadequate and a satisfactory one has been installed, and in order to make the changes in the folds more positive a 1" steel ball is now put into the tubing before the ends are sewed together. This combination of 1" steel ball and a 3/8" pot eye causes the ball to be pulled up to the pot eye, the tubing sliding over it and then entering the pot eye.

This induced an additional drag on the rolls which was compensated for by the addition of extra weight on the loading arm of the top roll to the amount of 16 pounds. This necessitated a change in the drive from 5/16" belt to a 1/2" V belt. The results of the addition of the steel ball are graphically illustrated in the samples on the cards which can be seen at the exhibit.

The original rolls were covered by neoprene and during operation these slipped on the shafts. This difficulty has been overcome by substituting molded covers of Hycar.

A baffle plate has been added, being placed just behind the rolls which now directs the tubing positively into the tub, and this has eliminated the troubles previously encountered when the tubing often make loops outside the tub.

Screens have been added to the suds boxes which eliminate the clogging of the suds box drains by flock.

The rinse water reservoir and rinse water distribution piping have been revised to cause equal amounts of water to enter the tubs during rinsing.

The next job will be to modify the dimensions of the suds boxes and baffles which has been found necessary to do.

Mr. Nutting feels that real progress has been made and it is the desire of his committee to continue this work immediately in order to finish as soon as pos-

sible the development of the machine to the point where it can confidently be recommended as a really useful tool in making comparisons in detergency.

The new section on Standard Soil had its first meeting on June 5 in New York. There were 15 people present who had previously indicated their willingness to cooperate in the difficult and long task of determining how to make Standard Soil which will simplify to a great extent the study of detergency.

E. A. Vitalis of the American Cyanamid Company was selected to serve as Chairman, and his progress to date is quite satisfactory. He has sent out a questionnaire to those interested requesting information on their requirements for running detergency tests.

He has received 50 yards of the General Dyestuff standard printed soil material, and samples of this material together with five representative detergents have been sent to the members who are to cooperate in the first interlaboratory check.

These tests will determine whether such tests are practical and have significance.

Mr. Vitalis has stated the immediate plans for the future as follows:

1. Investigate available soiled fabrics
2. Investigate the literature and commonly recommended soils
3. Study the theory of soil removal
4. Develop one or more soiled fabrics that will give direct evidence on the value of a detergent for a specific washing problem.

Chairman Bonnar: After hearing what this Committee intends to do, and seeing the Detergent Comparator, you will agree that they are well under way on their progress.

William Holst is here, ready to report for the Light Fastness group.

Light Fastness

Wm. Holst: The work of the light fastness group has, during the past year, been directed at continuing the job which was started several years ago, the search for an adequate calibrating medium for existing Fadeometers. I think you are all familiar with the need for such a medium.

The blue wool standards of the Association have been and continue to remain the fundamental light fading standards, but there is a considerable portion of the textile trade which prefers, in some instances, to rate fastness to light in terms of Fadeometer hours, and experience has shown that existing accelerated fading devices such as the Fadeometer vary considerably from one machine to another in fading rate.

This gives rise to considerable difficulties in comparing results of one machine to the other, and indicates a necessity for placing the machines on a common basis.

This basis has been worked out to be a standard machine operated at the National Bureau of Standards in Washington, which is equipped with all the necessary controls for maintaining a constant fading rate reproducible at all times. These controls, by the way, are much too complicated and too expensive to consider as an addition to commercial Fadeometers.

We therefore wish to find a medium by which we may rate those commercial Fadeometers in terms of this standard machine. The Bureau has experimented with a number of fading papers, and during this year the choice worked out to be between two papers, known as "A" and "E"—both dyed blue, the "A" being a heavier dyeing than "E".

In starting the work on the choice between these two papers, we found that besides differences between various commercial machines, we could also obtain variations in fading in one machine due, in par., to lack of vertical alignment between the swatchholders as they hung in the machine. This required a mechanical improvement in the existing commercial Fadeometer; after testing several devices, with the cooperation of the manufacturer, we arrived at the use of a lower ring with one section removable for servicing the machine for the usual cleansing of glass or replacement of carbons, and the addition of a lower clamp to the sampleholders, so that upper and lower rings are engaged by both clamps, thus assuring automatic vertical alignment for all swatchholders.

This device has been tried out by three members of the Committee and has been found adequate. The Committee has recommended to the manufacturer that it be made a part of any future machines sold, and that the device be made available to users of present Fadeometers at a nominal cost. The new lower ring and the clamps are on exhibition upstairs in the Exhibit Hall, both in the Atlas Booth and in the Light Fastness Booth, and I believe they intend to circularize all Fadeometer owners so that they may be acquainted with the terms on which they may put this desirable improvement on their existing machines. This applies to both FDAR and FDA machines.

The Papers A and E were tried out, and were sent to a considerable number of individuals for trial and for choice; in our September meeting, held at Rochelle Park, we had a very large representation, both from the cooperators, not actually Committee members, and the Committee. We had, I would say, about 30 present; and we had mail replies from 15 or 20 more; and they represented dye manufacturers, dye users, merchandisers, testing laboratories, and other people who have occasion to use Fadeometers. Their opinions were received and tabulated, and the great majority were agreed on three points.

The first was the use of the lower ring device on the machine, which I have already discussed.

The second was that Paper A gave them the means of calibrating their machine and would serve a very useful purpose in that respect.

The third was to approve a change we had recommended in the standard machine, slowing its rate of fading. We made that change so that the speed of that machine would be in agreement with our blue wool standards; and that change was also approved by the Committee.

We offer these suggestions to the Research Committee as a whole, with the expectation they will grant their approval. We intend to write up the use of the calibrating paper in the next Year Book, under the Light Committee's report for the year.

Future arrangements for the supply of the paper are at present being undertaken by the Bureau of Standards, where we anticipate, at least for the time being, they will remain. The Atlas people will supply the papers with future machines which they sell, with instructions for their use.

We do not believe that the paper is perfect. We believe that it offers us something useful in a rough approximation to what we are looking for. We do not intend to rest with this paper, but intend to look for something better, and as soon as we can find it, or any method of measuring radiation on the samples which will be more accurate than the calibrating paper, we would like to investigate that, also.

Chairman Bonnar: I feel that it is unnecessary to ask for a vote of confidence for these changes that Mr. Holst's Committee has voted on. It is not a change of any one of our standard testing methods and therefore is not necessary to vote on; but it sounds good as someone who has been close to these Fadeometers can tell you, to hear that we are really doing something where we *know* what we get out of the Fadeometer instead of just guessing at it. I am sure you all feel the same way.

Dr. Hager is here and even though the machine they set up is not changed, there are a few aspects we would like to have

reported on at this time.

Flammability of Consumer Textiles

Dr. Herman E. Hager: At the March 21 Research Committee Meeting, our method and machine were accepted as an AATCC standard.

The National Bureau of Standards, at about the same time, sent this method out as a proposed commercial standard to some three thousand interested parties.

At a hearing before a Congressional committee on flammability legislation, also in March, the Cotton interests objected to this proposed commercial standard very strenuously. They did not wish to see it tied to a law. They also felt that they did not have time to study the subject thoroughly and that our method was not sufficiently accurate.

In view of these objections the standing committee to the commercial standard appointed a joint Technical Committee of 17 members under the chairmanship of Mr. Rulon of Underwriters Laboratory which comprises cotton and rayon interests, retailers, manufacturers and testing groups, including AATCC. On the strength of this committee's decision, the National Cotton Council supplied seven laboratories with thirty-three cotton fabric samples including short and long napped cottons, nets, sheers, plisses, and chenilles. These were tested according to our specifications on our 45° angle machine. The results showed fair correlation on most fabrics but erratic figures on some and particularly on all chenilles. The summary of these interlaboratory tests is that on tufted fabrics our method and machine do not provide the degree of consistency which would be necessary for the successful enforcement of this standard. It was therefore decided to do further work with borderline and high pile fabrics. Since the exactness of the individual machines was questioned, it was decided to return the six instruments for a careful check-up to United States Testing Company. Also two of the laboratories will study the question of uniform drying of the samples, since it was felt that on chenilles slightly varying conditions, as they are possible with our present method, might well be the reason for poor correlation.

The committee also decided that these borderline and high pile fabrics should be tested on the horizontal type machine which the Bureau of Standards has developed and of which five have been constructed. The committee feels unanimously that the question of setting up a flammability standard for all fabrics is extremely complex. It is, however, optimistic that with further work it might yet be possible to set up a commercial standard which is acceptable to the industry.

Chairman Bonnar: Dr. Coughlin is here. The Committee on Dimensional Changes in Textile Fabrics is in his charge.

Dimensional Changes

Dr. W. E. Coughlin: I have a very short report to make for the Committee on Dimensional Changes, on the work done up to date in 1947.

During the year 1947 to date, three Steering Committee meetings were held; two meetings of the Home Laundering Division and one meeting of the newly formed Sub-Committee on dimensional changes in woven woolen fabrics.

Most of the work during the past year has been carried out on rayon fabrics. The Sub-Committee on Home Laundering, under the Chairmanship of Arthur Heinzman of Syntex Mills, conducted shrinkage tests on both stabilized and unstabilized rayon fabrics. These tests involved laundering and shrinkage measurements carried out in commercial laundries, in homes, and in textile laboratories. The fabrics investigated were tested for shrinkage by such varied procedures as CS-59-44, CCC-T-191A, and ASTM. These tests indicated that the correlation between the results predicted in tests on stabilized rayons and the results attained in practice was very great; and that equilibrium in shrinkage is established very quickly with stabilized rayons.

With unstabilized rayons, however, the various test methods indicated a considerable variation in results and also a lack of correlation between the test methods and the results obtained in either commercial laundry practice or home laundering. Further studies on nonstabilized rayons involving successive launderings in a commercial laundry and of repeated laboratory tests on the same fabrics by Cluett Peabody and Good Housekeeping, indicate further discrepancies between present test methods and performance in use. Cluett Peabody tested each of the dozen fabrics five successive times by using Federal specifications CCCT-191A for rayon, Good Housekeeping used an equivalent procedure except that an automatic washer and hand ironing were used instead of the dash wheel and flat bed press. The results of these studies indicated definitely that; (1) Unstabilized rayons do not attain their maximum shrinkage in one test procedure; (2) The number of test procedures necessary to attain shrinkage equilibrium in unstabilized rayons varies greatly depending upon fabric and yarn construction; (3) Commercial laundry procedure attains on the average a greater shrinkage than do successive test methods. These results indicate that further work is necessary in order to devise an accelerated washing procedure so that unstabilized rayons may be made to reach their shrinkage maximum in a more predictable manner and in a shorter cycle of operations.

One of the Steering Committee meetings this year was for the purpose of organizing sub-committees for the study of methods for measuring dimensional changes in laundering of stabilized wool fabrics. At this meeting it was decided that the studies on wool could be accelerated if the work were divided between three different sections, namely: Philadelphia, Boston, and New York. Joseph Goodavage was appointed Chairman of the Philadelphia section, which is to study test methods for measuring shrinkage in woolen socks; and Arthur Anderson was appointed Chairman of the sub-committee in Boston, whose work was to be on dimensional changes in woven woolen fabrics. It was decided that the New York section would handle the subject of dimensional changes in knitted woolen fabrics.

Subsequent to this Steering Committee meeting, Louis I. Weiner of the Research Laboratory of the Philadelphia Quartermaster Depot submitted to the Steering Committee a status report, project 26-45, on shrinkage resistance of textiles, one of the research activities of the Military Planning Division of the office of the Quartermaster General.

It was apparent from the great amount of work done by Mr. Weiner and his associates that most of the work which the New York section might undertake would be a duplication of the studies of the Quartermaster Corps. As a result of a further study of Mr. Weiner's report and with a desire to eliminate unnecessary work on knitted woolen fabrics, for which the New York section does not appear to be well-prepared, I would like to suggest that the AATCC studies on dimensional changes on laundering of knitted woolen fabrics be postponed until it is determined that studies over and above those currently being carried out by the Quartermaster Corps be necessary. I have not been assured by Mr. Weiner, or others at the Quartermaster's Textile Laboratory, that these studies will be made available to us, but it is quite evident that the Quartermaster Depot will make these available, based on a statement made in Mr. Weiner's report, this statement is: "Unless warranted by general interest, no individual reports will be made of textile method developments but such descriptions will be included in papers devoted to particular subjects to which they apply."

If the recommendation of the Research Committee is that we depend upon the work of the Quartermaster Laboratories for standards on testing dimensional changes in laundering of knitted woolen fabrics, I will be glad to contact Mr. Weiner in order to determine whether this cooperation can be effected.

The Boston Section on woven woolen fabrics has had its first meeting. The members of this sub-committee are, Hugh Christison, Arlington Mills; John Dalton, Pacific Mills; Alex Morrison, American Woolen Company; Edward M. Lynch, Jr., Derby Company; and Chairman, Arthur Anderson, New England Testing Laboratory. The objective of this committee is the establishment of a standard testing method for the evalution of woven woolen fabrics. It has projected studies involving work on stabilized and non-stabilized wool fabrics. They plan to check present practices determining wool shrinkage in order to determine correlation of results and also to check the correlation between the present Pacific Mills accelerated procedure involving seventy-five sudsing operations, but evaluated in terms of other methods such as commercial laundering, wool washing as practiced by the National Institute of Dyeing and Cleaning, Home washing and Quartermaster methods.

The one subcommittee chairman who is here this evening is Joseph Goodavage, who can tell us something about what the Philadelphia Section is doing on knitted socks. I would like to introduce Mr. Goodavage.

Joseph Goodavage: This Committee, whose objective is to develop an accelerated test which we hope will make it possible to evaluate shrink-treated wool socks, has so far had two meetings. I am happy to say we have the services of four laboratories offered us and any personnel required to conduct evaluations.

We have seven active members and to date we have contacted the President of the National Hosiery Manufacturers Association and learned that they also have a committee interested in the very same objective. It was decided that we should hold our next joint meeting in the offices of the National Hosiery Association in New York. We hope that from there on we will be able to report material progress.

Incidentally, it came about that the Hosiery Manufacturers Association will contribute all of the hosiery necessary in carrying out the evaluation in this work. I think that will mean quite a saving to the organization and to other interested individuals. We hope to report progress very shortly.

Chairman Bonnar: I am sure it is the consensus of this group of the Research Committee that it is foolish of us not to avail ourselves of the assistance that Dr. Coughlin thinks he can get from the Quartermaster or anyone else. We shouldn't duplicate work that is already done. Unless I hear an objection, we will ask him to go ahead and get that help, as much as he can, as a basis for his further work.

I don't want to imply that the silence of other committee chairmen means they have not been active during the year. That is not the case. They just felt that the progress they had made was not ready to report at this meeting; whereas, those you heard tonight really have constructive messages to bring to you and some "meat" to their delivery.

I do want to say in closing the meeting that even though this is the last official meeting that Professor Olney will have opened, that he doesn't need to think he is just going to sit on the sideslines, because I know someone who is going to lean on him very heavily in the future.

I also want to thank the committees for working very, very hard. Now we will close by saying "Thank you" to Professor Olney, who has done a splendid job over these past years. We know he is going to be with us in the future.

. . . The audience arose and applauded . . .

Chairman Bonnar: This meeting stands adjourned.

Notice to Secretaries of Local Sections

All reports, papers and discussions should be sent to the National Secretary.

Notices of future meetings should be sent to the American Dyestuff Reporter.

Vat Acid Dyeing

(Concluded from Page P777)

60-40. The dyeing operation is easily conducted on continuous equipment, whereby, only surface saponification of the acetate takes place. The pad-jig method also yields satisfactory results, the acetate being dyed as a result of saponification in the conversion of the acid leuco to the sodium leuco compound. It must be stated that the only advantage over the pigment padding proces is one of time saving in the number of ends required. Heavier shades dyed on blends of 60-40 spun rayon-spun acetate show the same tendency toward unevenness as by the Pigment Method, the rayon being slightly heavier than the acetate. These remarks also hold true for constructions composed of spun rayon-spun acetate-animal fibers.

The vat acid process is of no interest for the dyeing of nylon. The same disadvantages exist as in the application of vat dyestuffs in pigment form. The process may, nevertheless, find some application in the dyeing of spun rayon-nylon blends, provided the nylon content does not exceed 40%. Ivestigation in the field of application is still in the experimental stage.

The use of alkalies other than caustic soda for conversion of the vat acid to the sodium salt has been studied both experimentally as well as in practical application. For fabrics composed only of vegetable fibers, caustic soda is entirely satisfactory to use; and it is of course the cheapest alkali. As previously mentioned, the more rapid conversion to the sodium leuco enables use to be made of a milder alkali such as trisodium phosphate, yielding equally as satisfactory results as caustic soda with the vast majority of vat dyestuffs. This is a distinct advantage for the dyer who is called upon to apply vat dyestuffs to fabrics containing protein fibers.

From the description of the methods used in vat acid application, this process may appear to be a cumbersome one. There is no reason to expect it to replace to a large extent other processes well known to dyers and in general use in vat dyestuff application today. The claim, nevertheless, can be made that the vat acid process will yield results on certain constructions of piece goods, surpassing in appearance and in quality, results obtained by the pigment padding method; and on certain yarn counts, an improvement in levelness.

• PATENT DIGEST •

Flame—and Waterproofing at the Same Time G, 2, 03

U. S. Pat. 2,424,831
(Quaker Chemical Products Corp., Klaber, July 29, 1947)

The object of the present invention is to find a composition by which fireproofing and waterproofing might be carried out in a single step. It is well known that it is impossible to simply mix the fireproofing and the waterproofing agents without breaking the emulsions generally used in waterproofing solutions. The hydrolizable aluminum salts, applied in most of these formulas are stable only in an acid medium below a pH = 4.85. When on the other hand a fire resistant salt, having a pH low enough for being blended with the waterproofing emulsions would be used, the composition might very likely attack the fibers. The problem is therefore to find out a liquid composition, having a pH not exceeding 4.85, but forming after the impregnating and drying operations a compound of a pH above 5.85 on the fiber. Water repellent agents are for instance aluminum salts or other metal salts (zirconium) emulsified together with paraffin wax. An example is a mixture of two solutions:

Water repellent part:

7 p. emulsified wax-aluminum salt
33 p. water

Fire resistant part:

Zinc chloride	10 p.
Borax	4 p.
Glacial acetic acid	2 p.
Water	44 p.

It is claimed that by mixing these two solutions, while vigorously stirring, a stable dispersion is obtained which has first the desired pH = 4.85 while after drying the pH rises (by volatilization of the acetic acid) to a point where the fibers are no more tendered.

References cited by the Patent Office are amongst others:

U. S. Pat. 2,381,487 (Arkansas Co.—Cook, Whitworth): rendering fabrics or other fibrous materials fire retardant and water repellent either in one bath or in a two-bath-process by adding a hydroxy-aliphatic acid (glycolic, lactic, malic, tartaric) to the fire retardant solutions (borax, ammonium salts) and combining this solution with a water repellent emulsion of wax, aluminum salt and gelatin.

U. S. Pat. 2,334,098 (Peter Cooper Corp.): hardening glue-formaldehyde-aluminum salt finishes by first impregnating with an acid emulsion and drying whereby the acid volatilizes and the pH is increased so that coagulation occurs.

U. S. Pat. 2,314,242 (Porter Morse): an interesting process for making cloth fireproof and waterproof at the same time by impregnating the fibrous material with a water-in-oil emulsion; the oil-phase contains an asphalt-degras emulsion, the aqueous phase the fireproofing salts, for instance ammonium sulfate, phosphate or borate.

Other References are:

U. S. Pat. 1,947,597 (Bemberg) may be mentioned. Metal oxides dissolved in ammonia are used for impregnating fibers, giving at the same time water repellency and flame resistance. Fresh precipitated nickel oxide is transformed in nickel tetramin-hydroxide and this solution reacted with aluminum powder. A complex nickel-hexamin aluminate results which has the effect mentioned above. U. S. Pat. 1,821,317 (Mirov) proposed to combine Gilsonite (as a water repellent) with sodium stannate and ammonium sulfate (as a flame resisting agent).

PAUL WENGRAF

Urea—Complex Compounds—Used for Impregnating G, 1

U. S. Pat. 2,423,556
(Heyden Chemical Corp., Feibelmann, July 8, 1947)

New useful compounds of *urea and potassium formate* or other salts of weak acids are obtained having quite surprising properties. It has been found that complex products result having a higher solubility than their components. They differ also from the initial products by different crystallization points. The reaction product of urea (one mol) and potassium formate (2 mols), for instance, needs only 10% its weight of water to form a solution stable at room temperature. Thus 100 p. water can dissolve 900 p. of a compound consisting of 663 p. potassium formate and 237 p. urea. It is sufficiently proved that a new compound is formed here by the fact that urea itself is only soluble in equal quantities of water and potassium formate itself only at the ratio of 330 : 100. These concentrated liquids have an (probably hydrotropic) effect on otherwise water insoluble substances, solubilizing for example ammonium sulfamate in glycerin, preventing gelatine solutions from gelling and so on. According to an example 3 mols = 180 p. urea are added to 2 mols = 168 p. potassium formate in 50 p. water. The resulting compound has a crystallization point of 58° C. The solution can be used for every kind of impregnating, wetting and softening operation. The title of the specification points at a preferable use in the paper industry.

References cited by the Patent Office are amongst others:

U. S. Pat. 2,290,503 (Grove Silk Co.): urea is used as a plasticizer for raw natural silk in the course or after the throwing operation. Molten urea + alkali salts, for instance $NaNO_3$ or sodium bicarbonate are recommended for rapidly dissolving sericine instead of oil.

U. S. Pat. 2,265,144 (Christopher—Beukelaer): a certain percentage of urea is added to glue for imparting it resetting properties but not so much as to keep the glue hygroscopic after drying.

U. S. Pat. 2,281,599 (Arnold Hoffman): weighting textiles by impregnating with a *mixture* of urea and magnesium sulfate; this mixture has to replace the lost weight and is not intended for finishing effects.

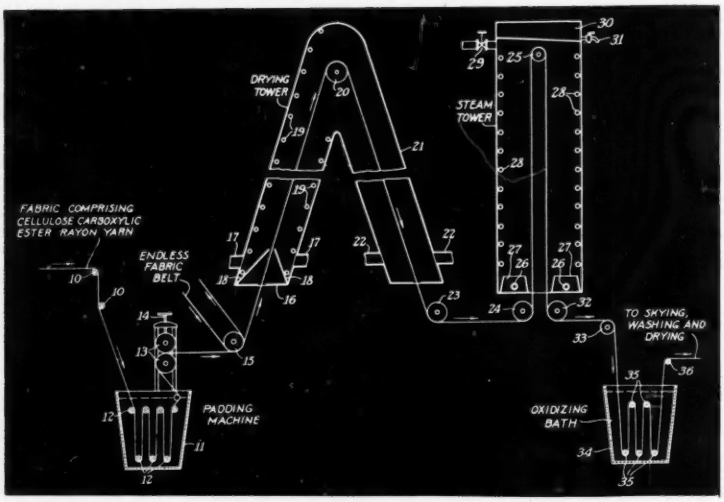
U. S. Pat. 2,268,674 (Richards Chemical Works): describes a softening agent for paper, consisting of a mixture of urea, glycerine, talc, dispersed in water.

The reaction protected by the present patent seems to be based on the formation of a hydrotropic solution. The phenomenon of hydrotropy has lately been discussed by McKee in Ind. and Eng. Chem., April 1946, p. 382. Useful information on this subject can be found here. Urea by itself was known as a hydrotropic agent (cf. Neuberg, 1916, Transactions of the Pruss. Acad. of Science, p. 1034—see also Ger. P. 652,362 of I. G. Farbenind.—Rein: urea, used for keeping acrylic acid esters in solution). But the *condensates* of urea with the salts, mentioned in the present patent, are obviously new compounds which may still become more important in the field of solvents and finishing agents.

Dyeing Cellulose Acetate; Anthraquinoid Vat Dyes C, 4, 07

U. S. Pat. 2,424,857
(Eastman Kodak Co., Scull, July 29, 1947)

Dyeing of cellulose acetate with anthraquinoid vat dyestuffs did not meet with success up to now because of the rela-



Dyeing Cellulose Acetate (U.S.P. 2,424,857)

tively high alkali concentrations required for vatting this dyestuff group. The fiber was generally completely saponified by this procedure. It has been suggested to use in this special case alkali phenates instead of caustic alkalies but the obtained shades were rather poor. The present invention developed a method which might best be characterized as a modified pigment padding process. It consists of the following steps: *a)* padding with a mixture of the vat dyestuff pigment + alkali, thickener and a stable alkaline reducing agent (for instance formaldehyde sulfoxylate which is decomposed only above 140° F.); *b)* drying without contacting its "useful surface" (i.e. the surface later on used for manufacturing garments and the like); *c)* treating with steam (ageing) and *d)* re-oxidizing. *c)* is the most important part in this treatment. The vat dyestuff is substantially reduced and the fiber is superficially saponified at the same time so that the ester cellulose gets sufficient affinity for the leuco-vat-substance. The accompanying drawing illustrates the process: the fabric is padded in the roller box (11), squeezed out in (13, 14) passed over a roller covered with a blotting cloth (15), through the drying tower (16), operated with hot air and the dried fabric is carried downwards and conveyed through an ager (30) to the oxidizing bath and so on. It has to be repeated that saponification and dyeing occur at the same time in the ager (30).

References cited by the Patent Office are amongst others:

U. S. Pat. 2,205,032 (du Pont): a vat dye composition is described. A penetrating agent, particularly a phthalic acid ester is incorporated into this composition (Example: benzyl-acid phthalate of sodium or sodium isopropyl phthalate, etc.).

U. S. Pat. 2,318,133 (du Pont-Wentz): the fabric is padded with a mixture of alkali, vat dye and hydrosulfite and developed by an after-treatment with a mildly alkaline solution of hydrosulfiite; thus the reduction is carried out in two different steps.

U. S. Pat. 2,067,927 (Nat. Anil. & Chem.): printing vat dyes according to the usual formula to which lower dialkylsulfates (example sodium ethylsulfate) are added as anti-foaming and penetrating agents.

U. S. Pat. 2,233,101 (Nat. Anil. & Chem.): vat dyes are pasted up with the sodium salt of di-isobutyl sulfosuccinate, thus with substances of the Aerosol-type.

Other references are:

The problem of dyeing acetate of cellulose with vat dyes was solved in different ways: protective colloids were used to prevent damaging of fibers by the strong alkalies. Such substances are for instance: sulfite waste liquor according to Brit. P. 214,320 of Clayton Aniline, alkaliphenates (as mentioned in the preamble of the present patent) according to Brit. P. 252,208 of Celanese. The innovation offered in the present invention is in the use of formaldehyde sulfoxylate, decomposing at higher temperatures, combined with the superficial saponifying reaction occurring at these elevated temperatures.

Bleaching—Pre-treatment with Per-acids B, 5

U. S. Pat. 2,426,142
(du Pont, Campbell, Aug. 19, 1947)

It is common use to treat cotton fabrics before the bleaching process proper with an inorganic, particularly sulfuric acid, in order to improve the absorbency of the textile goods and to attain thereby a better white effect. It has been found, according to the present invention, that a much better effect results from a pre-treatment with a per-acid, such as per-sulfuric acid, peracetic acid, monoperphthalic acid or monopersuccinic acid (which can be prepared by the action of concentrated hydrogen peroxide on the corersponding acid anhydride according to U. S. Pat. 2,284,477, du Pont—Reichert et al.). The concentration of the per-acid-bath may vary between 0.5-20% and accordingly the time of the treatment has to be adjusted in order to avoid oxycellulose formation. The per-acids appear to act selectively on non--cellulosic impurities which effect is not obtained by applying the usual normal acids. It has to be emphasized that this per-acid treatment is only a *preliminary step* before carrying out the bleaching process. Generally the subsequent procedure consists of a bleaching operation, as described in U. S. Pat. 2,267,718 (du Pont—Campbell, Fennell), covering the known J-box alkaline boiling pre-treatment of textile goods. It is stated however that the method, protected by the present invention can also precede every other bleaching process of the kier-type and so on as well. A desizing operation with an enzyme (Rapidase) may or may not be combined with this peracid-pretreatment. Tables show that superior absorbencies result as compared with the effect of sulfuric acid. The improvement is especially noticeable in goods which has been boiled and bleached afterwards.

References cited by the Patent Office are amongst others:

U. S. Pat. 2,110,649 (E. Franz): covering a peroxide bleaching process for *wool top* wherein the goods are impregnated with an alkaline soap while the peroxide bath contains oxalic acid as a stabilizer.

U. S. Pat. 2,304,435 (du Pont): describing a treatment of goods stained with naphthol dyes by aplpying organic peracids.

U. S. Pat. 2,145,062 (Mathieson Alkali): relating to a bleaching process with chlorite solutions.

U. S. Pat. 2,283,141 (Buffalo El. Chem.): is a patent, connected with the "Becco"-process, consisting of a treatment of gray goods with an acid solution, impregnating them with hydrogen peroxide, followed by steaming.

U. S. Pat. 2,087,584 (Metz-Hirschberger): describes a pretreatment of goods with a sulfofatty acid emulsion before entering the kier.

Other references: Peracids themselves have been recommended as bleaching agents in U. S. Pat. 2,370,588 (Pittsburgh

Glass Plate): percarbonates and in U. S. Pat. 2,287,064 (du Pont): persuccinic acid. Preparing and bleaching at the same time can be carried out by a treatment with the sodium salt of alkyl-(stearyl-) persulfuric acid (Brit. P. 394,989, Flesch). U. S. Pat. 1,978,953 (du Pont) suggests to treat goods to be bleached with perborate having the formula $NaBO_3.H_2O_2.HBO_2$.

Polyvinyl Resin Finishes—Deep Penetration Prevented G, 2, 01

U. S. Pat. 2,424,386
(Texproof Limited, Czeczowiczka, July 22nd, 1947)

Resin coatings have mostly the disadvantage of unduly stiffening the textile material to which they are applied. The present invention has the purpose to prevent the coating composition from penetrating deeply into the fibrous material. The goods are first impregnated with a volatile liquid, dried and thereafter coated with a vinyl resin solution. Preferably a plurality of these vinyl resin layers are applied. The "volatile liquid" consists principally of an aqueous solution of agents which are capable of forming emulsions with the ingredients, contained in the vinyl resin layers. An intermediate emulsified film is generated on the surface which does not allow of penetration or permeation through the fibrous material. At the same time a satisfactory bond between the resin and the textile results. The aqueous solution consists for instance of dilute ammonia, calcium alginate and a wetting agent such as an alkyl aryl sulfonate. The proper coating masses contain besides the vinyl resin solution (polyvinyl acetate, vinyl chloride-acetate or polyvinyl butyral) some stearic acid which reacts with the ammonia of the preparation, forming ammonia soap as an emulsifier on the interface.

References cited by the Patent Office are amongst others:

U. S. Pat. 2,130,530 (Plastergon Wall Board): describing a surface coating process with an aqueous nitrocellulose lacquer dispersion, evaporating the organic solvents and drying the coated surface.

U. S. Pat. 2,142,986 (du Pont): cloth is treated with a suitable softening agent such as the sodium salt of sulfated octadecyl alcohol, fixed by *desacylated chitin* and at the same time treated with a waterproofing agent.

U. S. Pat. 2,311,488 (Amer. Anode Inc.): a rubber coating is applied; the coagulating agent consists of a wetting agent (butyl lactate) sparingly soluble in the acid-salt solution used for coagulating the finish.

U. S. Pat. 2,317,779 (Janser—Brainos): casings of paper or the like are first dipped in a higher alkylsulfate, a sulfonated fatty acid or the like, thereupon in a water soluble protein salt (sodium caseinate) and finally in a hardening composition.

Other references: A coating process likewise carried out in two steps has been described in Brit. P. 451,669 (du Pont): as the first layer a cellulose ester solution of low viscosity is applied, while the second—the proper coating—layer, no more penetrating into the inner part of the fibers consists of a higher viscous solution of the same type.

Water Repellent Fabrics—Aluminum Salts Blended with Cellulose Zincate G, 2, 02

U. S. Pat. 2,426,300
(Edelstein, August 25, 1947)

The usual one-batch-water-repellent coatings or finishes are composed from wax, glue or gelatin, a soluble aluminum salt and water in which the components are emulsified. This composition is of course not resistant to repeated washing operations. It has been tried to mix dispersions of this type with a fixing agent, for instance with cellulose-ethers but the ether solution sets in this case immediately to a gel. It has now been discovered that a sodium zincate solution (prepared according to the inventor's U. S. Pat. 2,322,427) may be mixed with such a one-batch emulsion without risking the formation of a gel. The procedure is described as follows: wax is incorporated in the cellulose zincate solution and a fabric is impregnated therewith, washed and dried. An additional step follows consisting of treating the fabric in a dilute aluminum salt solution before giving it the final drying treatment. Different waxes may be used, for instance paraffin wax, melting above 100° F., optionally plasticized with petrolatum. According to an example a marquisette mosquito netting is padded in a cellulose zincate solution, prepared as follows: a batch composed from wax and aluminum salt is mixed with equal parts of water. This emulsion is added to a cellulose zincate solution (ratio: 30 parts emulsion to 100 parts zincate solution) and the fabric is impregnated with this finish, soured with 5% sulfuric acid, rinsed, neutralized with ammonia, rinsed again and dried. Another example suggests to modify this process by first impregnating with the wax-cellulose-zincate dispersion, acidifying, neutralizing and passing through an aluminum acetate or formate solution. It is remarkable that the acid aluminum salt solution (pH between 4.5-5) (of the first example) does not precipitate cellulose contained in the alkaline sodium zincate solution.

References cited by the Patent Office are amongst others:

U. S. Pat. 2,308,664/1943 (Dow Chemical): wax emulsions are dispersed in an ammoniacal solution of aluminum cellulose glycolate.

U. S. Pat. 2,298,147/1942: resist prints using an Asiatic wax—paraffin oil—aluminum acetate dispersion under Indigosol dyeings.

Other references: Water repellent coatings consisting of solutions of regenerated cellulose, combined with waterproofing, low melting substances in general have been described in U. S. Pat. 2,045,410 (Richter-Brown). Aluminum salts of cellulose glycolic acid have been mentioned as water repellent finishes in U. S. Pat. 2,087,237 (du Pont).

See also abstracts in the AMERICAN DYESTUFF REPORTER, 1946, p. 460 (Ger. P. 749,082) and 1947, p. 367 (Brit. P. 581,436, Heberlein).

Drying Fabrics Improved by Enhancing Absorbency G, 1

U. S. Pat. 2,426,561
(Pacific Mills, Musser, Aug. 26, 1947)

The rate of absorbency of a cellulosic material may be improved and this effect will be permanent after repeated drying and wetting operations by treating *cellulosic* textiles with an *alkylphosphate*. Wetting agents have obviously only a temporary effect while the absorbency attained by this treatment survives many wetting and drying processes. Examples are tributyl phosphate and sodium butylphosphate: a desized gray cloth is kier-boiled in an aqueous solution containing 2% sodium hydroxide, 1% sodium carbonate, 0.5 % pine oil and tributylphosphate (in the amount of 5% calculated from the weight of the fabric). After a regular bleaching process the rate of absorption (tested by the Eichler method of Chem. Abstracts 1940, p. 8290) was strongly increased.

A theory is offered which may explain this surprising effect. An ethercellulose (here a butyl cellulose) is apparently formed. The etherification proceeds to a point of a maximum water absorbency while the ether is still insoluble in water or alkalies. The controlled (limited) etherification process increases the property of the material to take up and to give off water in a given time.

References cited by the Patent Office are amongst others:

U. S. Pat. 1,483,738/1924 (Lilienfeld): explaining that alkyl ethers of cellulose having a small number of alkyl groups have a *very restricted field of utility*. Thus this patent does not comprise the products prepared according to the present invention.

U. S. Pat. 2,101,262 (du Pont): relates to low substituted methylcelluloses by steeping them into an alkaline solution of sodium methylsulfate: the products have to be used as starting materials for ethers and esters but they are in contradistinction to the present product already soluble in alkalies.

U. S. Pat. 2,264,229 (Sylvania): in order to obtain crimped wool-like staple fibers cellulose ether- (or ester-) filaments are *irregularly* esterified (or de-esterified) to form non-uniform products crimping in a further treatment.

Other references: Alkylphosphates have been used up to now for quite different purposes. Alkylammonium phosphates give a flameproofing finish on cellulose according to U. S. Pat. 2,262,634 (Monsanto). The alkyl phosphates are further generally known as wetting agents (U. S. Pat. 1,900,973) but the wetting effect is not permanent as in the present case where a limited alkylation, thus a partial change of the celluolse molecule is attained. This reaction has apparently not been described up to now.

Shrinkproofing Wool—Chlorosulfamates A, 2, 04

U. S. Pat. 2,427,097
(Kamlet, Weisberg, Beer, Sept. 9, 1947)

The object of the present invention is to reduce shrinking and felting of wool with a chlorinating agent and to avoid at the same time detrimental secondary effects of chlorine on the fibrous substance. Halogenation, especially chlorination is generally carried out with free chlorine, hypochlorous acid or hypochlorites, halogenated amides such as the chloramides or chlorinimides (for example "Activin" = p-toluene sulfonchloramid). These substances have been applied from an aqueous or alcoholic solution. It is known that the usual treatments have the effect of making the fabrics harsh and yellow and that uneven chlorination occurs. Halogen applied in the presence of amino products has also been recommended but in this event the wearing properties are reduced. It has been found that shrinking or felting of wool and other keratinous textile fibers can be reduced without discoloration or other undesirable effects (harshness) by the following steps:

a) a formaldehyde pretreatment;

b) a treatment with a monochloro sulfonamide, for instance $OH.SO_2.NHCl$ = chlorosulfamic acid, dichlorosulfamic acid = $OH.SO_2.NCl_2$, their sodium salts and similar products. These compounds are obtained acording to the equations:

$$NaSO_2NH_2 + HOCl \rightarrow NaOSO_2NHCl + H_2O \text{ (Monoproduct)}$$

and

$$NaSO_2NHCl + HOCl \rightleftarrows NaOSO_2NCl_2 + H_2O \text{ (Diproduct)}$$

This latter reaction is reversible and a steady and slow dechlorination takes place by hydrolysis of the product on the right side when the relative concentration of the di-product increases. Formaldehyde, known to have a protecting effect in this case is used either in a pretreating bath (as mentioned above) or in the acid chlorosulfamate bath itself. The process is carried out at room temperature but temperatures up to 60° C. are permissible. The presence of cation active, thus acid resistant wetting agents has proved to be favorable. According to an example crystalline sulfamic acid is added to a cooled hypochlorite solution which is cautiously neutralized with glacial acetic acid. The final product contains predominantly sodium dichloro- and some monochloro sulfamate. This substance is applied to a woolen fabric after a formaldehyde pretreatment and eventually the material is treated with bisulfite.

References cited by the Patent Office are amongst others:

U. S. Pat. 2,311,507 (du Pont): describes shrinkproofing wool with a chlorine, containing compound and liberating HClO in contact with water. Examples are halogenated N-chloroamides or imides, sodium- N-chlorotoluene sulfonamide, etc.)

U. S. Pat. 2,144,824 (Landshoff & Meyer): chlorinating wool with hypochlorites and protein degradation products (the so called "lysalbinic acid").

Other reference: The chloramides and related products have generally been used as bleaching, disinfecting or starch degrading agents. N-chloro-N-alkyl-sulfamic acids (example N-chloro-N-isopropyl sulfamic acid) have also the property of giving off chlorine and to act as bleaching agents and preservatives (U. S. Pat. 2,288,-976/1942, duPont).

TRADE NOTES • NEW PRODUCTS

OBITUARY

OTTO W. SCHAUM

OTTO W. SCHAUM of Germantown, Philadelphia, died on December 8th in the Germantown Hospital at the age of 81 years, after a long illness.

Born in East New York, he came to Philadelphia in his early teens and after serving his apprenticeship in the shops of Wm. Sellers & Company of Philadelphia, he entered the services of Wm. P. Uhlinger, builder of looms and centrifugal extractors. Textile machinery had been his main interest. He held a number of valuable patents, and had been an important factor in the development of the modern narrow fabric loom.

Mr. Schaum was the founder of Schaum & Uhlinger, (later Fletcher Works, Inc.) manufacturers of looms for weaving ribbons, tapes and other narrow fabrics; centrifugal extractors used in the textile, chemical and laundry trades; and throwing machinery for rayon, silk and nylon. He also founded the Atlas Ball Company, now a part of the SKF Industries. After serving as President of Fletcher Works, Inc. for many years, he became Chairman of the Board of Directors in 1933, which position he held at the time of his demise.

Otto W. Schaum

He was a member of the Union League of Philadelphia, The American Society of Mechanical Engineers, a Knight Templar and Shriner. He was a former President of Whitemarsh Valley Country Club of Philadelphia, and the Maskenosha Rod and Gun Club of Bushkill, Penna.

Surviving are his wife and a son.

Correction

Re: One-Bath Method of Dyeing Acetate Developed Black.

In the above-named abstract which appeared on page 663 of our November 17th issue, the following sentence should be inserted after the words "4% Plutoform Black CAM or 4% Phenamine Black BD": "All weights are based on types of rayon present."

• Courtaulds' Representatives Visit Calco

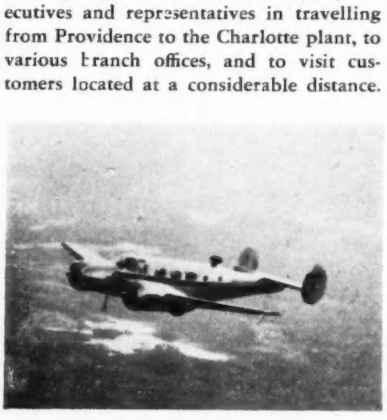
Two representatives of the British textile firm of Courtaulds, Ltd., recently visited the Bound Brook plant of the Calco Chemical Division, American Cyanamid Company. After making a tour of the extensive Research and Application Laboratory facilities of the Calco organization, both R. J. Kerr-Muir, North American representative of Courtaulds, and William Penn, of Courtaulds, Coventry, England, now on an extensive tour with Courtaulds, Ltd. (Canada), observed that American industry had made remarkable strides in the mechanization of laboratory facilities.

Mr. Penn was particularly impressed with the lengths to which dye manufacturers go to render complete technical service to the color-consuming industries. He stated that American technical literature was very much in demand among the English dyeing and finishing establishments.

Courtaulds' Representatives at Calco: Reading left to right, Dr. A. L. Peiker, Manager Dye Application Laboratories, Calco Chemical Division, American Cyanamid Company; William Penn, Head of Dyeing Department, Coutaulds, Ltd., Coventry, England; Dr. George L. Royer, Asst. Director Physical Chemical Research, Calco Chemical Division, American Cyanamid Company; R. J. Kerr-Muir, North American Representative, Courtaulds, Ltd.

• Arnold, Hoffman Buys Airplane

Arnold, Hoffman & Co. Incorporated, manufacturing chemists with headquarters in Providence, R. I., have recently purchased a Beechcraft Twin Engine 5-passenger plane for use by company executives and representatives in travelling from Providence to the Charlotte plant, to various branch offices, and to visit customers located at a considerable distance.



Arnold, Hoffman Beechcraft in Flight.

It is anticipated that this move will greatly facilitate intra-company contacts and speed up company service to customers.

• Placement Bureau at Lowell

Lowell Textile Institute announces the establishment of a central Placement Bureau to facilitate the placement of its graduates in the industry.

According to President Kenneth R. Fox, the Placement Bureau, which will function through the Office of the Dean, will have three primary purposes.

(1) To assist the graduating students in getting placed in the industry.

(2) To assist in the upgrading and re-establishment of Lowell Textile Institute alumni who might wish to make a change.

(3) To assist the textile industry in locating adequately trained personnel.

The establishment of the Placement Bureau has been made necessary by the tremendous increase in the demand for Lowell Textile Institute graduates which has taken place simultaneously with the large increase in enrollment and the steady increase in demand by a greater and greater variety of manufacturers.

An invitation is extended to all companies interested in obtaining textile school trained personnel to participate in the services of the Placement Bureau which will include the scheduling of interviews with prospective candidates, making available student records and Faculty rating sheets and all other pertinent data which would be of interest to a prospective employer.

All inquiries concerning the Placement Bureau should be addressed to James W. Bell, Assistant Director of the Placement Bureau, Lowell Textile Institute, Lowell, Massachusetts.

• To Receive IRI Medal

Games Slayter, vice president in charge of research and development of Owens-Corning Fiberglas Corporation, has been chosen to receive the 1948 Industrial Research Institute medal presented for outstanding contribution to the field of industrial research.

The Institute, composed of ninety-three companies representing diversified types of industry throughout the nation, cited Mr. Slayter for his leadership in the development of glass fibers and their commercial application. The medal will be presented February 5 during the winter meeting of the Institute at Rye, N. Y. Previous recipients of the award were Dr. Willis R. Whitney, organizer of General Electric Research Laboratory, and Dr. Charles Allen Thomas, executive vice president of Monsanto Chemical Company.

• Passes $100,000 Mark

Albot Stevens, General Chairman of the New England Textile Foundation's Second Campaign to raise $250,000.00 for the benefit of the four textile schools in New England, announced that 24 days after the opening of the campaign on October 28th, 79 gifts and pledges had been received for a total of $110,385.00. Largest single gift received was $20,000.00, while the average gift was $1,397.00.

Mr. Stevens stated that the campaign will continue into the first half of 1948 until the required amount of money is raised. Schools benefiting from these gifts are Bradford Durfee Technical Institute, Fall River, Mass.; Lowell Textile Institute, Lowell, Mass.; New Bedford Textile Institute, New Bedford, Mass.; Textile School of Rhode Island School of Design, Providence, R. I.

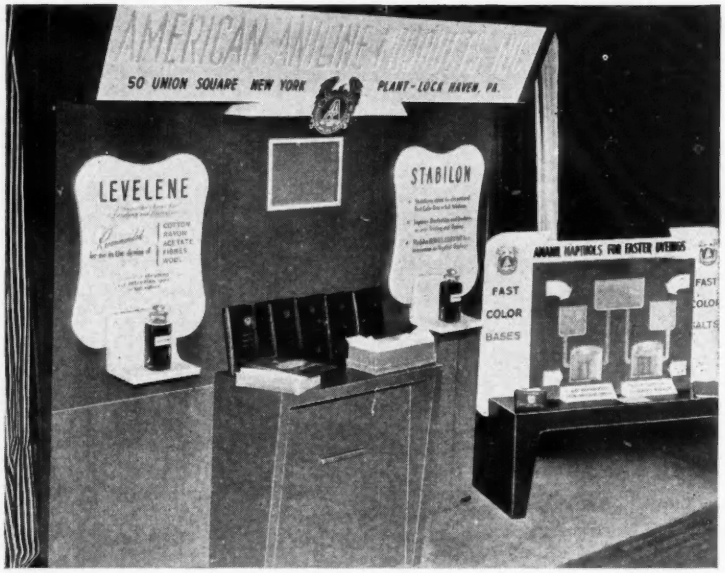
As a result of the Foundation's First

• Bocon Vice-President

John B. Wathey, who has been elected vice president in charge of research and development of the Bocon Chemical Corporation. Mr. Wathey was formerly with Wilbert Products Co., where he developed a number of progress patents on one of the four water repellents meeting specifications set by the Quartermaster General for application to fabrics used by the armed services during the war. Prior to joining Wilbert he was chief chemist at the Cranston Print Works, Cranston, R. I. He is a graduate of Brown University.

At Bocon, Mr. Wathey will direct laboratory research on new products and textile mill application of Boconize, the company's new, durable compound which is said to protect animal fiber fabrics from moth attack and resist both washing and dry cleaning.

• American Aniline Exhibit



Shown above is the exhibit of American Aniline Products, Inc., at the AATCC Convention held in the Congress Hotel, Chicago, last October. An electrically operated panel illustrated the results that may be obtained by using Stabilon in the application of Amanil Napthols. Stabilon is a solubilizing agent for diazotized fast color base or salt solutions which is said to improve penetration and levelness in both printing and dyeing. It is also stated that Stabilon reduces crocking to a minimum on Napthol dyeings. The use of Levelene was also featured at this exhibit. A series of colored photographs were projected on the panel in the center of the exhibit which showed various scenes in the manufacture of dyestuffs.

Campaign in 1946-47, grants totaling more than $140,000.00 have already been made to the schools. These grants are for scholarships, faculty aid, and new equipment.

Recipients of the first scholarships given by the Foundation completed their freshman years at Lowell Textile Institute and Rhode Island School of Design in June, and most of them had outstanding records. Two won highest honors in chemistry, 6 were on the First Dean's List, 2 on the Second Dean's List, and 2 on the Third Dean's List.

Mr. Stevens further stated that textile mills are being asked to give at the rate of $5.00 for every employee, and companies dependent in whole or in part on the textile industry, at a lower rate,—from $100.00 on up into the thousands, depending on their size. He pointed out that one department store chain gave $10,000.00 to the Foundation during its first campaign.

Contributions should be sent to the Foundation at 68 South Main Street, Providence, R. I.

• Directors, N. Y. Board of Trade

The New York Board of Trade at its 74th Annual Meeting held on Tuesday, December 9th, elected a group of new Directors. Among those elected were the following representing the drug, chemical and allied trades: B. R. Armour, President, Heyden Chemical Corp.; Stanley I. Clark, Vice President, Sterling Drug Inc.; James G. Flanagan, Secretary & General Counsel, S. B. Penick & Co.; Harold C. Green, National Accounts Representative, L. Sonneborn Sons, Inc.; Clark L. Rodgers, Eastern Sales Manager, Owens-Illinois Glass Co.

Fred J. Stock, Vice President, Chas. Pfizer & Co., Inc., who had been elected during the course of the year was re-elected for a longer term.

• Warwick Chemical Foundation

Warwick Chemical Foundation, which was formed for the purpose of setting up memorials to the memory of three members of Warwick Chemical Company killed in World War II, announced endowments to three colleges this week.

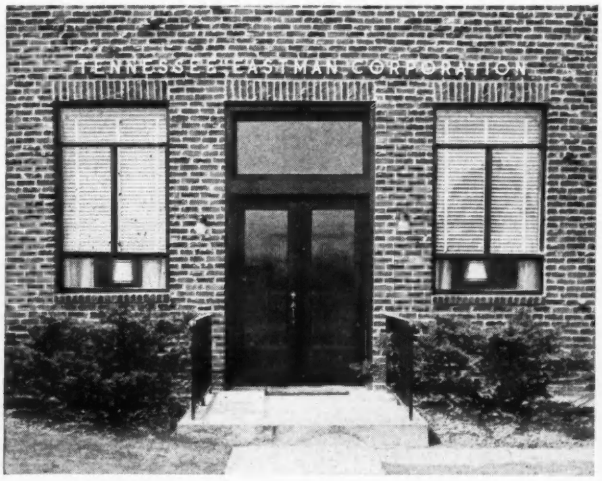
Awards of $3000 each were made to Lowell Textile Institute, Lowell, Massachusetts, in memory of Walter Nowicki; Clemson College, South Carolina, in memory of Manfred Caranci and Philadelphia Textile Institute, Philadelphia, Pennsylvania, in memory of Walter W. Lane. The principal in each case is to be held as part of the general capital endowment funds and the income is to be used as the governing board shall designate, primarily for scholarships to encourage education and research in chemistry, to enable worthy students to pursue graduate studies in chemistry, and otherwise to promote chemical education.

Announcement of the awards was made by Ernest Nathan, President of Warwick Chemical Company, and President of the Warwick Chemical Foundation.

• Sindar Corporation Formed

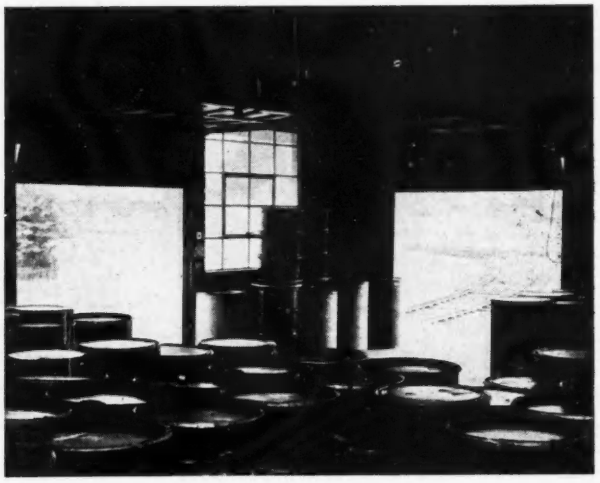
Givaudan-Delawanna, Inc., of New York, announces the formation of Sindar Corporation, a separate company that has been formed to take over the activities formerly carried out by the Industrial Products Division of Givaudan-Delawanna, Inc. Sindar Corporation will therefore be devoted to the manufacture, promotion and sale of industrial aromatics, antisep-

• Tennessee Eastman Dyestuff Plant at Lodi



Tennesseee Eastman Corporation, Kingsport, Tennessee, maintains a modern plant (see entrance above) at Lodi, New Jersey, for service and distribution of its dyestuffs to eastern U. S. customers. The new unit serves as a warehouse and sales center, stocking a complete line of Eastman Acetate Dyestuffs for prompt delivery to dyers in New Jersey, New York, Pennsylvania, Delaware, and New England. It also boasts a well equipped service laboratory for testing and research on various dyeing problems

The staff took occupancy of the modern building last December, before construction was completely finished. Now, to handle the expanding requirements of the dyeing industry, further construction is being contemplated.



Drums of Eastman Acetate Dyestuffs are stored in the large warehouse of the Tennessee Eastman Corporation plant at Lodi, New Jersey, ready for distribution to eastern dyers. The building, located on New Jersey State Highway No. 6, convenient for truck transport, is also served by a spur of the Susquehanna Railroad (visible through the warehouse door in the picture), assuring the sptediest possible delivery of dyestuffs.

Distribution of Eastman Acetate Dyestuffs through this warehouse offers many advantages to dyers in the eastern area. Other areas in the United States are served through the home plant in Kingsport, Tennessee. Canadian sales are made through Clough Dyestuff Company Ltd., which maintains stocks of Eastman dyes in Montreal.

tics, germicides, mildewcides, preservatives, stabilizers, and other products for such industries as textile, rubber, paint, paper, plastics and printing inks.

The development of the two phenolic compounds, G-4 and G-11, which have been acclaimed from a diversity of sources, opens new and wide vistas which the concentrated efforts of Sindar Corporation will be best able to exploit. It will be recalled that Compound G-4 has been recommended as a fungicide and preservative, and Compound G-11 as a germicide and an antiseptic. Other groups of industrial chemicals produced by Sindar include anti-skinning agents, stabilizers and preservatives.

Sindar Corporation is located at 330 West 42nd Street, New York City, and has branch offices in Chicago, Los Angeles, Philadelphia, Cincinnati, Detroit, Seattle and Boston, and is represented in Canada by Stuart Brothers, Ltd., of Montreal and Toronto.

• PTI Alumni Banquet

Fleet Admiral William F. Halsey, Jr., former commander of our Third Fleet, is to be the principal speaker at the Forty-Seventh Annual Banquet of the Alumni Association of The Philadelphia Textile Institute. In making this announcement the president of the Alumni Association, Robert A. Smith of American Viscose Corporation, stated that the banquet will be held at 7 P.M. in the Union League, Philadelphia, on Thursday evening, January 22, 1948.

Admiral Halsey is now serving as National Chairman of the University of Virginia's Development Fund and is devoting his post-war time to the advancement of education. Mr. Smith pointed out that his work is of particular interest to those who would advance textile education. From his rich and exciting experiences, a colorful presentation by the Admiral is assured.

A feature of the banquet will be the 25th reunion of the Class of 1923, under the chairmanship of Donald Durie of Donaldson and Durie, 261 Fifth Ave., New York. Members of the class who have not yet been in touch with Mr. Durie were urged to make reservations for the banquet with him.

The Board of Governors of the Philadelphia Textile Institute has arranged its meeting day to coincide with the Alumni Banquet so that members of the Board will have the opportunity to attend the banquet which will usher in the forty-seventh year of the Alumni Association.

• Joins Textile Resin Department

The American Cyanamid Company announces the appointment of Miss Bernice S. Bronner as assistant to G. C. Ramey, advertising manager of the Textile Resin Department. She will make her headquarters at the firm's New York office, 30 Rockefeller Plaza.

For the past several years Miss Bronner has been with the American Standards Association in charge of consumer goods standards. Prior to that she was for five years head of the Textile Laboratory at Good Housekeeping Institute.

Miss Bronner is secretary of the American Association of Textile Technologists; vice-chairman of the Membership Committee, American Association of Textile Chemists and Colorists, New York Section, and a member of the American Home Economics Association.

In her new association Miss Bronner will assist in the advertising and promotion of the department's textile resin products, including Lanaset Resin, Sheerset Resin, Lacet Resin, and Permel Resin.

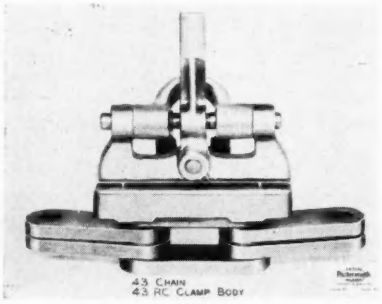
• Proctor Bulletin

Proctor & Schwartz, Inc., Seventh Street and Tabor Road, Philadelphia 20, Pa., has recently issued a bulletin entitled "Proctor Equipment for the Textile Finisher." This bulletin contains information on the following items: Proctor Super Speed Drying System, Proctor Suction Cylinder Dryer, Proctor Roller Dryer and Curer, Proctor Loop Dryer and Curer, Dalglish "Overfeed" Pin Tenter, Proctor Multipass Airlay Dryer and the Proctor "Slack" Dryer. Copies of the bulletin are available upon request.

• New Butterworth Chain

High speed tentering without excessive wear on the tenter chain and without extreme vibration is claimed with the "43" Tenter Chain recently announced by H. W. Butterworth & Sons Co.

The speed of the tentering operation in steaming, drying, starching, mercerizing, dyeing or curing has heretofore been limited by the speed of the chain. At speeds in excess of 150 yards per minute for straight automatic tentering and in mercerizing tenters, the ordinary malleable iron tenter chain wears excessively.



Front view of the new Butterworth "43" Tenter Chain for use on finishing tenters and mercerizing tenters of Butterworth or other make. It is said to minimize vibration and wear in high speed tentering operations. Damaged clamps are quickly and easily replaced without disturbing the chain.

It is stated that the Butterworth "43" Chain, a hardened steel chain with precision ground surfaces, has been in use for six years, 24 hours a day, six days a week, in one of America's leading finishing plants. Following are some of the results claimed:

(1) No appreciable wear on rivets or chain wheels.

(2) No signs of wear on guides in which the chain operates.

(3) Vibration practically eliminated.

(4) Reduced wear on control parts of clamp bodies.

Currently, the "43" Chain is standard equipment on all new Butterworth Tenters. It is also being used to convert earlier model tenters, both Butterworth and other make, to high speed operation.

With the new "43" Chain the operator can change a damaged clamp with only a few seconds shut down of the tenter. When clamp bodies require replacement for any reason, the removal of a single bolt separates each clamp body from the chain. Thus repairs can be made or clamp bodies replaced without removing any part of the chain.

• Activities Taken Over by Celanese

Effective December 1, 1947, all activities formerly conducted by various manufacturing and sales subsidiaries were taken over by the parent organization, Celanese Corporation of America, it was announced recently. The subsidiaries effected are: Celanese Company, Inc.; Celanese Plastics Corporation; Celanese Chemical Corporation; Celanese Export Corporation; Tubize, Inc.; Staunton Textile Corporation and Bridgewater Textile Corporation.

• New Calco Bulletin

A paper, "The Application of Microscopy to the Textile Industry", presented by Dr. G. L. Royer, Assistant Director of Physical Research, Calco Chemical Division, American Cyanamid Company, before the Scottish and London Sections of the Society of Dyers and Colourists, in England, in April 1947, has been reprinted as a Calco Technical Bulletin.

A copy of Calco Technical Bulletin No. 796 can be obtained from your Calco Sales Representative or by mailing your request to the attention of the Advertising Department, Calco Chemical Division, American Cyanamid Company, Bound Brook, New Jersey.

• Production at Heyden Plant

Pilot plant production of ortho and para dichlorbenzene, chemicals widely used as industrial intermediates and for mothproofing, is now under way at the Heyden Chemical Corporation plant in Memphis, Tenn. Full scale production is expected around January first. The addition of these new products to its regular line comes just a year after the plant began operation.

The product list of this plant, one of eight Heyden owns or operates in the U. S. and Canada, now includes chlorine, liquid caustic soda, hydrogen, monochlorbenzene and allied products as well as the two new chemicals.

The principal use of ortho dichlorbenzene is as a dye intermediate, but it is also an important solvent and is used for mothproofing. The para dichlorbenzene is also used for inhibition of moth attack and is a versatile intermediate for the production of medicinals, dyestuffs and other industrial chemicals.

Production of these two chemicals is expected to be followed before long by trichlorbenzene, a compound used in transformer oils, and for the protection of wood against insect attack.

The plant here was purchased by Heyden last year from the War Assets Administration and was placed in production in November, 1946. It uses an electrolytic process to obtain chlorine and other chemicals from rock salt, which is the base raw material. The chlorine, with the addition of a catalyst, is passed through benzol to produce the other products.

• Joins Evans Research

Marston Taylor Bogert, Emeritus Professor of Chemistry at Columbia University, and former president of the American Chemical Society, has been appointed Senior Scientific Advisor of Evans Research and Development Corporation, 250 East 43rd Street, New York. Mr. Bogert is a world authority on synthetic organic chemistry.

• General Aniline Personnel Changes

General Aniline & Film Corporation announces the following changes and promotions, effective immediately, at its Central Research Laboratory, Easton, Pa.

Dr. Donald L. Fuller, Dr. Carl Barnes and Dr. Fritz Max are promoted to the office of Associate Directors of the Research Laboratory.

Dr. W. W. Williams has been transferred from the Rensselaer dyestuff plant to the Central Research Laboratory as the Azo Dye Section Leader.

Drs. John Copenhaver and Clyde McKinley have been promoted to Section Leaders in the New Products Department of the Laboratory.

New Group Leaders in the Physics Department are Drs. J. M. Lambert, G. T. Gross and H. Hemmendinger; in Physical Chemistry, Dr. C. H. Benbrook; and in the Analytical Section under Dr. L. T. Hallett, recently named as one of the ten leaders in his field, Drs. C. W. Gould and S. Siggia were made Group Leaders.

The Photography and Polymers Division under Dr. Barnes has as new Group Leaders in Dr. W. A. Schmidt's Photography Section, Drs. J. A. Sprung and V. Tulagin. Dr. W. O. Ney is a new Group Leader in the Polymers Group.

The Central Research Laboratory is under the direction of Dr. A. L. Fox, with C. R. Wagner as General Aniline Vice President in charge of all Research and Development.

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AMERICAN
DYESTUFF REPORTER

VOLUME 36

JANUARY, 1947—DECEMBER, 1947

INCLUDING THE

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PROCEEDINGS OF THE
AMERICAN ASSOCIATION OF
TEXTILE CHEMISTS AND COLORISTS

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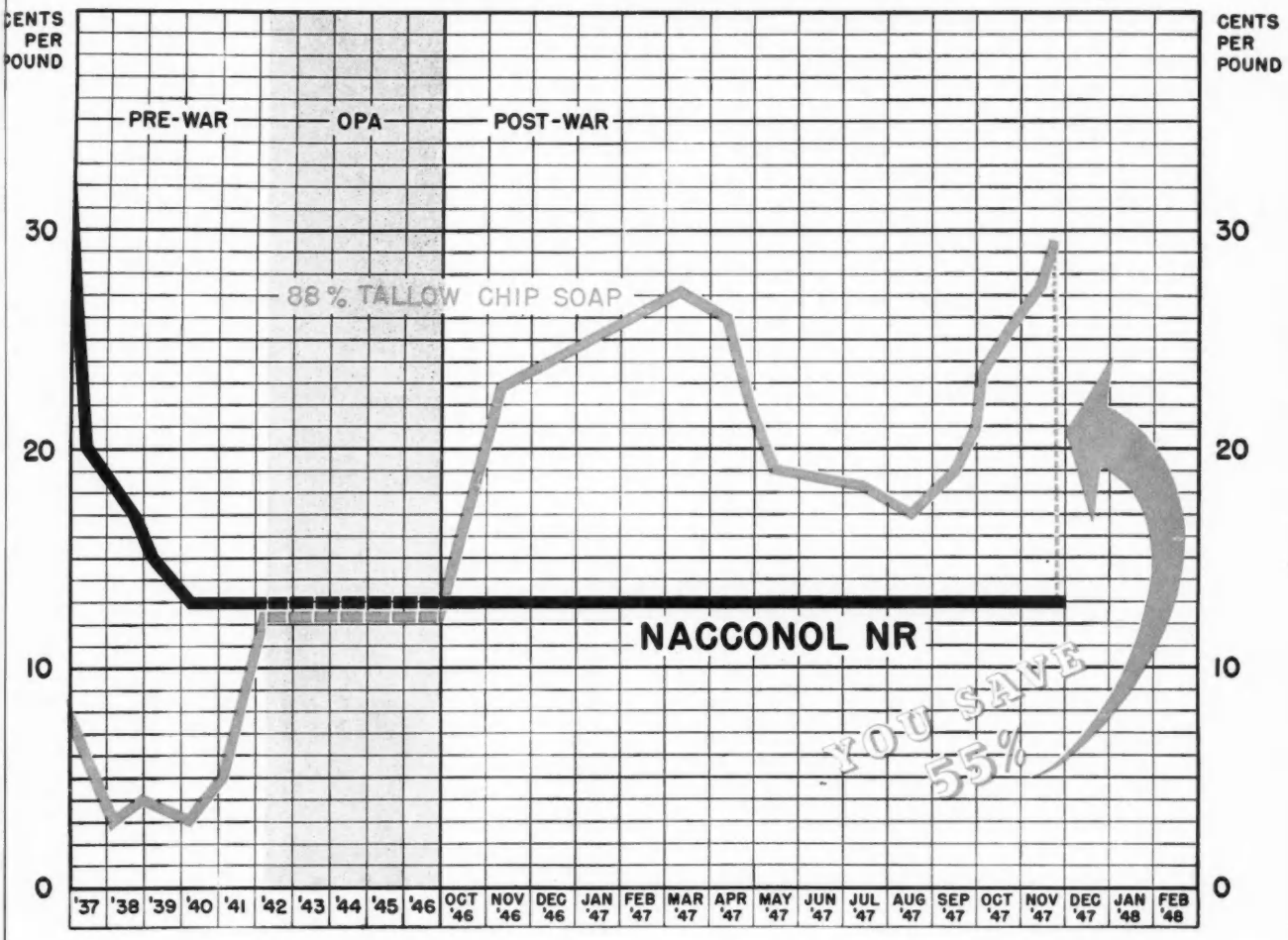
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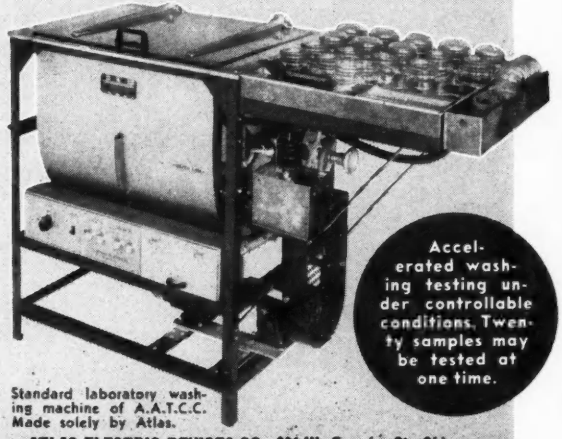

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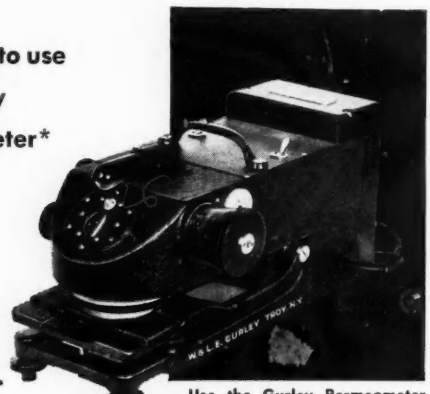

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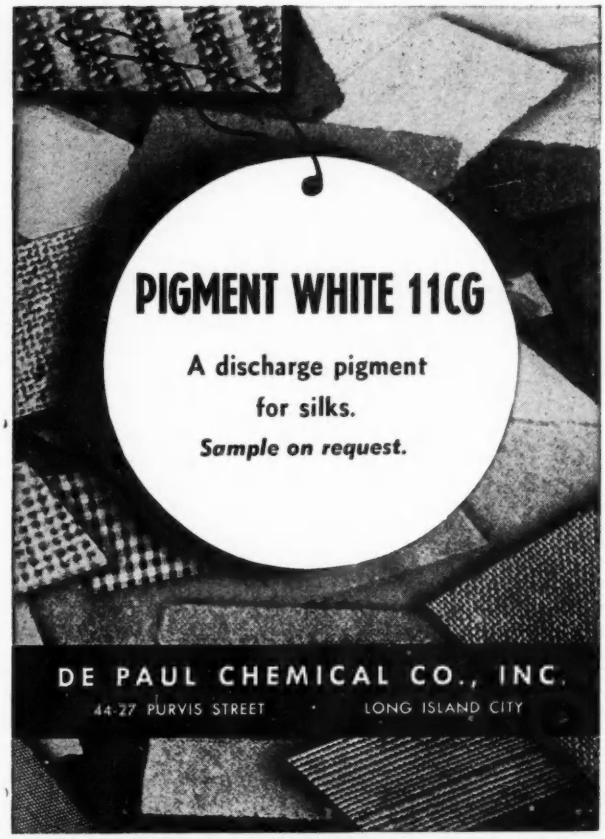

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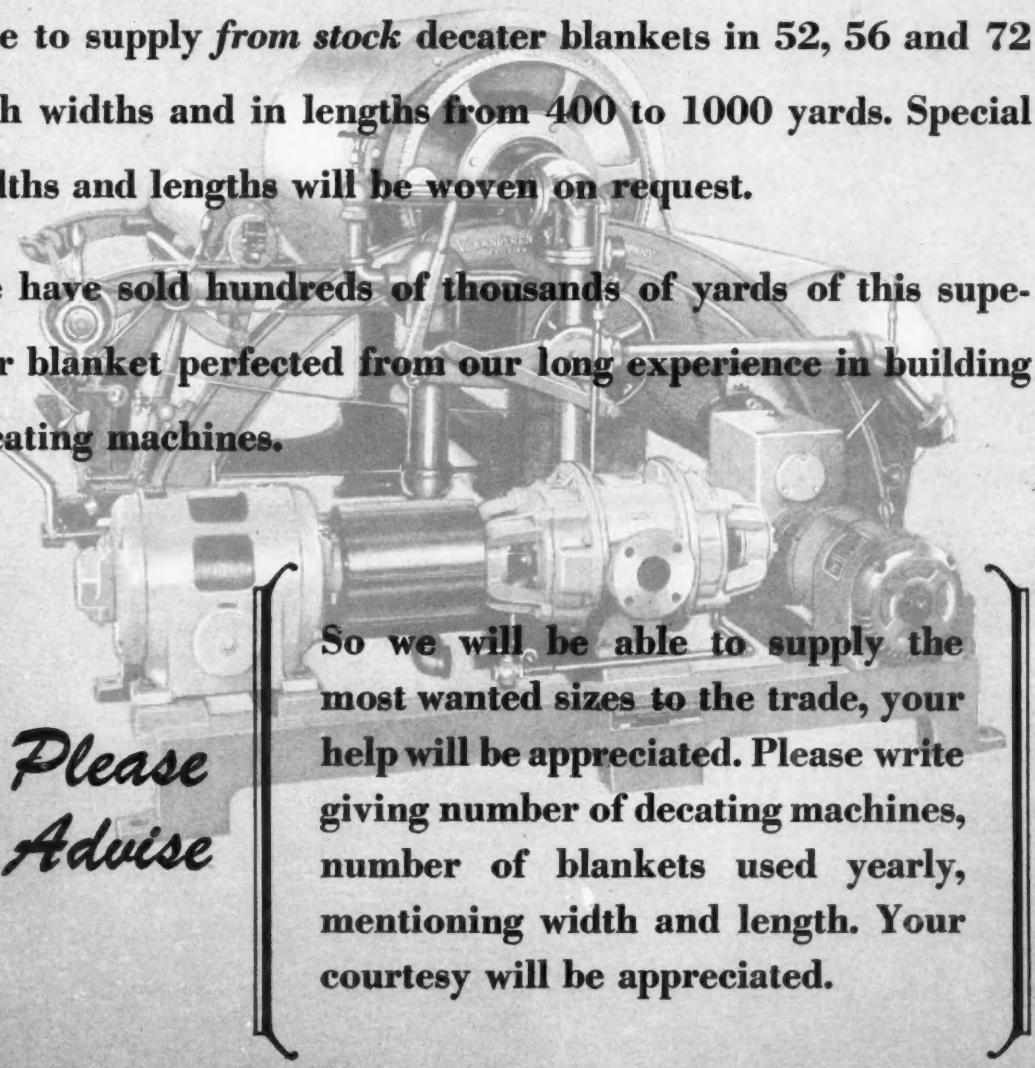

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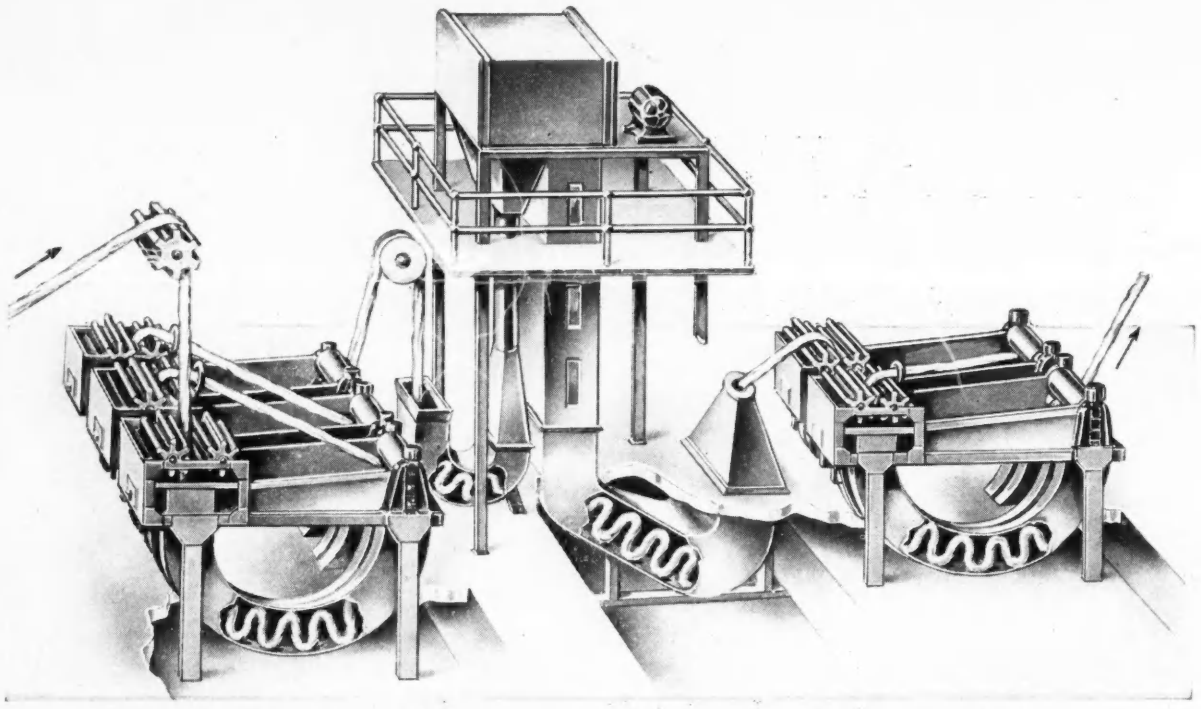

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